JOURNAL OF CLINICAL AND EXPERIMENTAL PSYCHOPATHOLOGY

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SENSITIVITY IN INSULIN COMA THERAPY
Albert E. Scheflen and Elliot R. Reiner

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Statement of Purposes

The JOURNAL OF CLINICAL AND EXPERIMENTAL PSYCHOPATHOLOGY is dedicated to the search for the fundamental factors in the etiology and pathogenesis of psychiatric disorders; to the training of an alert, progressive, and qualified psychiatric personnel; and to the stimulation and support of all phases of psychiatric service and research—biologic, chemical, psychologic, physiologic, and social.

In the pursuit of these aims, the JOURNAL OF CLINICAL AND EXPERIMENTAL PSYCHOPATHOLOGY will venture wherever the quest may lead. Its sole criterion will be the promise of an increment in the understanding of the mind's ills. It will seek, above all, to bridge national boundaries, language barriers, and the artificial demarcations of schools and trends.

The JOURNAL OF CLINICAL AND EXPERIMENTAL PSYCHOPATHOLOGY holds that there is no justification for the present discrepancy between the rich scientific technology available to psychiatry and the poverty of technics in current use in diagnosis, treatment, and research; no need for the gap between the promise of research and the paralysis of inquiry; no excuse for the lag of years between discovery and publication, demonstration and application in practice; no sound reason for the tragic chasm between the desire of the public for psychiatric education and guidance and the failure of the profession to provide the inspiration and leadership that would fully mobilize all latent potentialities. In brief, the JOURNAL OF CLINICAL AND EXPERIMENTAL PSYCHOPATHOLOGY is dedicated to the fulfillment of psychiatry as a science and a humanity devoted to the interests of all mankind.

The JOURNAL OF CLINICAL AND EXPERIMENTAL PSYCHOPATHOLOGY looks on psychiatry as an integral whole that is, in turn, an organic part of the world of science. It seeks to be not a mere sheaf of passive paper, but a dynamic organism by means of which its editorial board will endeavor to utilize every opportunity and facility in the field of human knowledge to fulfill the tasks to which it is dedicated.

JOURNAL OF CLINICAL AND EXPERIMENTAL PSYCHOPATHOLOGY

Clinical Reflections on Psychiatric Research

Prof. Dr. A. Vallejo Nájera

SCHOOL OF MEDICINE, UNIVERSITY OF MADRID

Psychiatric research has as its aim not only the discovery and description of pathologic phenomena of the mind, but also the study of the relationships of these phenomena and the induction of laws to which they are subject. Moreover, psychiatric research must explain facts empirically but without philosophic principles, because philosophizing has always associated psychiatry with metaphysics, and metaphysics has always restrained the scientific progress of psychiatry.

When we psychiatrists search for doctrines or theories with which to explain the causes of mental disturbances in man, we face a labyrinth of opinions, systems, and controversies, which involve us in a network of abstract terms, arguments and reasonings, that are confusing to the point where it becomes a real "scientific scandal" (Calkins). Since psychiatrists have no single body of doctrine (like the cellular or microbian doctrines in medicine) with which to explain observed facts, we follow various theoretic paths in research, and we are not always eclectic but rather tend to align ourselves with prejudices of schools or groups.

Although schools and scientific theories are responsible for much scientific progress, they are also responsible for some of the confusion in science. In Jaspers' magnificent introduction to his *General Psychopathology*, he points out prejudices that should be avoided in psychiatric research; but then even he shows his phenomenologic prejudice and fills his book with philosophizing without stopping to point out both the advantages and errors of each scientific orientation. When we examine the present state of Spanish psychiatric research, we find it is influenced by several trends—although no one trend dictates—and that in general terms these trends are the same we find among psychiatrists all over the world.

PHILOSOPHICO-ANTHROPOLOGIC ORIENTATION

The distinction established by K. Schneider between pure psychiatry, which studies psychic phenomena that can only be understood intuitively, and symptomatic psychiatry, which is concerned with those psychic anomalies identified with pathologic brain processes, delimits the field reserved to the speculative philosophers and empirical psychiatrists so definitely that it would seem that the influence of the former could be eliminated from the field of psychiatry in the future. However, the intellectualistic concept of neuroses on the one hand, and what is called scientific psychotherapy on the other, again make fashionable the role of philosophy in psychiatric research. That is, man is studied in his total make-up, and psychotherapeutists maintain that psychotherapeutic action cannot be taken without a prior conception of the world to give man his place in the cosmos.

The philosophico-anthropologic tendency has had repercussions among clinicians who think the empiric should be separated from the philosophic in psychopathology, just as in psychosis the organic should be separated from the psychical. Since existentialist philosophy has found easy currency in Germanic cultural circles, many psychiatrists adhering to that doctrine find in schizophrenia a fertile field for existentialist speculation, because, as Mayergross indicates, it is basic in an illness which isolates those functions in the patient, which in a healthy person are manifest in close union and compenetration.

In existentialist psychiatric research into schizophrenia, the point of departure is the idea that each aspect of the personality refers to the ego; psychiatrists of this school study mainly the symptoms of depersonalization, unreality, and changes in the personality. Among the many worthwhile studies there are Gelestattel's work on the personality of time and temporality in Heidigger's sense; Stoerring's work interpreting existentially the schizophrenic state of mind as a projection of the anxiety complex into environment; and especially the work of L. Binswanger on the fundamental schizophrenic disturbance, which he considers an existential process of emptiness or impoverishment that cannot be compared with dementia but rather develops with frightful feelings of existing in a void, experiencing internal death, or believing the world is coming to an end.

BINSWANGER'S EXISTENTIALIST ANALYSIS

Existentialist experimentation has become a method of psychiatric research which not only contributes new data, but also has established a psychotherapeutic method, e.g., the logotherapy of Frankl. The existential analysis by Heidigger, the German philosopher, finds its point of departure, its philosophic basis, and its methods in the structure of human existence which he calls "being-in-the-world." This is scientific-anthropologic investigation into human nature, and Binswanger wishes to free it from its ontologic and philosophico-anthropologic nature and convert it into an experimental science endowed with concrete ideas and its own methods, which are the methods and ideas of the empiric-phenomenologic sciences.

The purpose of existentialist psychiatric analysis is scientific research into and verification of the fundamental changes, which mental illnesses produce in the essence and factors of

the being-in-the-world structure. In this method of analysis the word plays an important part, for observed phenomena usually are explained verbally. To proceed with the analysis, a collection is made, over a period of months and years, of phrases, letters, idioms, poetry and drawings by the patient, since each of these bears the impress of the patient's personality. To this material is added psychodiagnostic data, and then experiments of free and conditioned association are carried out. Autobiography also plays a part, but only as material and not as the purpose of the research.

Existentialist analysis tries to get a comprehensive idea of the patient's world and of that world's fundamental structure. To achieve this end one must understand the patient from his own point of view, even though it may be incomprehensible; and that, of course is not psychology from the accepted point of view. We must try to understand what the schizophrenic means with his neologisms, pet words, disjointed phrases, expressions, etc. We have to learn to understand the world of the patient, and reproduce it for ourselves with the patient's own expressions. We must not work from our own world, but from the very different world of the patient.

We are indebted to Binswanger for existentialist interpretations of the world in which the autistic individual, maniac, and some schizophrenic personalities live. Gonzalo of Spain has also attempted an existential interpretation of the schizophrenic in the belief that one may speak of schizophrenic existence, which has its primary basis in existence itself.

Several points of agreement exist between existential analysis and Freudian psychoanalysis, but there are also essential differences. For contrary to the desire to hold the patient at a distance, considering him an object of the natural sciences and affirming the subject-object excision, existentialist analysis reaffirms the subject-object link and replaces distance by community. The difficulty of Binswanger's existentialist analysis is that it depends on recognizing the scientific idealism of Heidigger and furnishes the research man with only verbal concepts, which are differently interpreted in each language. In addition, it is a very slow method, cannot be used in habitual practice, and must be reserved for pure scientific research.

PSYCHIATRIC PHENOMENOLOGY OF JASPERS

Philosophic speculation is quite different from introspective methods of investigation into psychopathologic phenomena. Among the latter one could include existentialist analysis if it were not based on a philosophic doctrine, which is also the case with the philosophic phenomenology of Husserl, not to be confused with the psychopathologic phenomenology of Jaspers. Introspective methods represent a type of internal auto-observation (which is not spontaneous auto-observation) due to the clarity, order and acumen which the investigation introduces during the course of the examination. Scientific psychiatry owes its development to the analysis of psychopathologic phenomena, which lend themselves to introspection.

According to Stumpf, phenomenology is the science which studies internal phenomena, classifies them, and discovers their structure and laws of association. Competing with

phenomenology is the investigation of the essence, not of the objects but of the specific forms of consciousness of the objects and of forms corresponding to given classes of objects and their manner of being. However, phenomenology and phenomenic analysis (as distinguished from phenomenologic) are impregnated with philosophism and introspective psychology, as they are influenced by a series of philosophic theories coming from Brentano. That is why Husserl is opposed to philosophic psychologism and interprets phenomenology as a descriptive psychology of the manifestations of consciousness and of the contemplation of its essence. Through a purely intuitive method, Husserl describes in one essential universality the "vivencias" of representation, judgment, and recognition.

The psychiatric phenomenology of Jaspers differs from Husserlian phenomenology in that it is empirical and consists of representing to us intuitively the psychic states felt by the patient, considering them according to their condition of affinity, limiting them, differentiating them as strictly as possible, and applying precise designations to them. However, as soon as mental phenomena are understood statistically there follows a dynamic description of genetic comprehension, which explains their intimate relationship in time, the structure of their continuity, and how one gives rise to the other.

The object of phenomenologic analysis is sometimes the psychic event which presents itself to the consciousness free of content, or the development of conscious psychic phenomena, for the purposes of investigation of the fundamental disturbance from which they arise; a method to which we owe our knowledge of the psychogenesis of many varied syndromes and symptoms, particularly the schizophrenic, not to mention the fact that it has aided in differentiating one symptom from another. Psychiatric phenomenology is responsible for all the theories of Bleuler and Berze concerning schizophrenia by relating primary disturbances with a fundamental disturbance. We also detect phenomenist thought in C. Schneider when he refers to "content-free events in psychic happenings" and the "type of psychic execution" as well as in Barahona Fernandes' interpretation of the mental processes during insulization. Krisch is also overtaken by phenomenist functionalism when, concerned with the psychologic images of conversion in depersonalization, he speaks of the "loss of self-governing power," the "invasion of something foreign to the ego," and similar phenomena.

PHYSIOPATHOLOGIC RESEARCH IN PSYCHIATRY

The advances made in physiopathologic research in medicine suggest an etiopathogenic somaticist conception of mental illness embodied in the idea—which is extensively adopted today—that psychoses are general somatoses located in the brain. The diverse trends of the physiopathologic school in psychiatry are directly related to advances in physiopathologic and biochemical knowledge in our times.

Originally psychoses were thought to be caused by intoxications, a chemical theory of madness expounded long ago by Sennert (1572–1637) when he spoke of the toxic origin of acute delirium. The hypothesis of toxic madness was defended by Legrain at the end of the 19th century in a work stressing the effects of toxic substances on the brain. At

about the same time, Krapelin and Nissl undertook a series of demonstrative investigations to prove that any infection or specific intoxication gives rise also to a specific form of psychosis, all based on the idea that each poison produces a selective action on given regions of the brain.

When the attempts to prove an exotoxic genesis of psychoses failed, scientists began to investigate endogenous intoxications; and in recent years our attention has been drawn to the changes of porphyrin and the slow confirmation of porphyrinemia and porphyrinuria in different mental disturbances. Guenther suggests a direct exciting influence of porphyrin on the nervous system, since the stimulating—and up to a certain point, euphoric—action has therapeutically benefited from the hemoporphyrin.

The observation of certain facts concerning the influence of internal secretions on psychic life, the frequency of endocrine disorders in psychoses, the coincidence of female psychic perturbations with the menstrual cycle and with gestation, and the results of the administration of estrogens have suggested an endocrine etiology in psychoses and stimulated endocrinologic research. Consequently, investigation has been made into the action of hormones on each psychic function separately, and the relationships between endocrine alterations and exogenous and endogenous mental perturbations. Those who defend the psychophysical endocrine parallelism lose ground every day as their conclusions are proved too simplistic, and it is shown that the results of the administration of the purest products of internal secretion glands are not demonstrative, even in those cases where psychic alterations are directly related to manifest hormonal insufficiencies. The brilliant endocrinologic school of Marañón in Spain and Pende in Italy has not yet produced psychiatrists with irrefutable conclusions and perfectly demonstrable facts about psychoendocrine causality, while investigations into female psychoses of gestation by the author and his colleagues reveal just the opposite. We believe it to be indisputable that endocrine metabolism is reflected in cerebral metabolism, and that there exists a constitutional hormonal influence on soma, brain and psychism; but we do not admit that psychic disturbances are symptomatic of endocrine alterations.

In the field of general or partial metabolic alterations, not a single one of the biochemical discoveries has failed to tie up with the etiology of psychoses, and research men are greatly interested in Bonhoeffer's theory of the intermediate metabolic link. If our thought is directed by pragmatic and clinical criteria, we have to admit that when we investigate the organic substratum of endogenic or exogenic psychoses, metabolic alterations must occupy first place, as they give rise to circulatory, neurovegetative and other alterations which alter the functioning of the brain. It is indisputable, for instance, that acidosis and alkalosis influence psychism although no concrete conclusions have as yet been formulated concerning the mode of action of both alterations of basal metabolism. Furthermore, investigations into the metabolism of glucides, protides and lipides, as well as calcemia, potosemia and other components of the blood, have inspired many hypotheses (none of which has been proved) concerning the etiology of psychic disturbances.

Recently, in accordance with Loeb's orientation, we tried to explain the alteration of psychic phenomena arising from physicochemical disturbances, a tendency which finds its

principal support in encephalographic studies showing the permanent activity of nervous centers. The electroencephalogram furnishes us with a fertile method for somatic investigation into the normal and pathologic functioning of psychism, although so far, unlike its effects on neurology, it has not given many results in the psychiatric field.

A basis for physicochemical orientation in psychiatric research is also provided by studies of alterations of the chronaxie, which is a function of the colloidal equilibrium, in connection with those of the constellation of electrolites and which at given moments may reveal sensoperceptive corticoassociative or corticothalamic functions.

The influence of the physicopathologic school in psychiatry is also felt in the field of neuroses, especially since Bumke accepts Jahn's conclusions concerning the metabolism in circulatory asthenia and applies them to the etiology of neuroses. One of the many scientists working on this matter is Jiménez Díaz, who contributes facts in support of the influence of hyperventilation in certain neuroses, along with alkalosis, phosphaturia, disturbances of gastric secretion, and other metabolic upsets.

Notwithstanding the great number of experiments and facts, and the physiopathologic psychiatric credo which we profess, we believe that the present state of psychiatric research does not justify concrete affirmative conclusions concerning the nature of the biologic substratum of psychic alterations, a conclusion which may also be inferred from the reading of the monographs of Simarro Puig and Sole Segarra. The etiologic or physiopathologic problem seems extremely complicated, as was shown by the well-known principle of the etiologic nonspecificity of psychoses by Siemerling in 1893; "different infections, intoxications or cerebral traumatisms give rise to identical types of mental alteration, while the same cause produces, at times, very different syndromes."

ANATOMONEUROLOGIC RESEARCH IN PSYCHIATRY

In the 11th century, Constantine, "The African," proceeding from Galenic observations, traced a scheme of localizations of brain functions, a concept which came down through time to Sementini in the 17th century, the first author to ascribe a cerebral lesion to madness. The anatomist Gall discovered the functional importance of the gray matter in the brain and formulated the theory of cerebral localizations, which was confirmed by neurologists, histologists and physiopathologists right through the 19th century, and initiated an anatomopathologic era in psychiatry. Its greatest exponent was Griesinger, a German psychiatrist who attempted to prove that cerebral lesions exist for each type of psychosis; psychoses must be understood as the results of anatomical lesions, according to him, and close relationships exist between neurologic and mental diseases.

Griesinger's ideas were accepted by a group of competent enthusiasts who did further research and found focal psychic symptoms, which allow for localizing each psychosis in a given area of the brain. From among all the neuropsychiatric investigations, we must give preference to those carried out by Kleist on 276 war shock cases and 106 men with focal brain lesions suffered in accidents during peacetime. According to Kleist, observation, comparison, and study of the circumstances of any case lead both to a knowledge of the

given type of disturbance, as well as to the establishment of nosologic concepts. Griesinger attempted a kind of geography of cerebral pathology, investigated the localization of each one of the psychic symptoms, spoke of infracortical souls, and of the cortical soul and localized the disturbances of the ego in different cortical and diencephalic structures.

The neurologic school of psychiatry finds solid support in the infinite series of clinical facts gathered by many physicians to which are added the experimental facts concerning the participation of the subcortical mesencephalic centers in psychism. Among the experiments which support the theory of the participation of the cerebral trunk in psychism are the crises of rage provoked in the cat by Bark and Hess by the use of diencephalic stimuli; and also Foerster's observations of the crisis of maniac excitement of psychic inhibition, depending on whether the anterior or posterior hypothalamic region is manipulated during the course of intracranial surgical operations. In support of the neurologic school of psychiatry are the illuminating observations on postencephalitic lesions that give rise to obsessions, alterations of ideation, and changes in personality. The facts supporting this theory are of indisputable interest, but their interpretation is plagued by hypotheses which make for greater confusion. Reinchardt and other scientists see in the cerebral trunk the link which unites the psychic and the somatic, while Rohracher and Kueppers attribute to it a greater psychic importance than to the covering.

New methods have evolved in neurologic psychiatric investigation since 1936 with the introduction of the section of the white substance of the brain as a therapeutic method for endogenic psychoses. The leukotomy of E. Monis furnishes ample opportunity for investigating the problem of the relationship between personality and the frontal lobules. No definitive physiopathologic conclusions have as yet been formulated, but it must be admitted that the therapeutic section of the white brain substance may contribute to the understanding of psychophysiology.

The conclusions of Kleist and the psychiatrists of the neurologic school are very controversial and meet with vehement objections. Firstly, it is argued that, although it is true that certain lesions correspond to given psychic symptoms or syndromes, identical pathologic phenomena can be observed in psychogenetic psychoses without any indication of lesions; also functional lesions are not distinguished from organic lesions either by particular psychologic signs or by the succession of psychic phenomena in the course of the evolution of psychoses. It is likewise argued that no direct relationship exists between the extension and depth of cortical lesions and the demential disturbances which the patient shows. On the other hand, serious and extensive cerebral lesions may be produced without the appearance of psychic symptoms.

BIOPATHOLOGIC RESEARCH

The investigations by Jackson, Von Monakow and Goldstein lead to conclusions that completely change the old focalistic conception of the nervous system and point to what Lain Entralgo calls biopathologic mentality: the sick individual is considered, above all, as a living being struggling for his identity (to continue living) and for his integrity (to

continue undamaged) and account is taken of the fact that the lesion, the functional disturbance, and the relation of cause to effect, are the integrating factors of the adequate organic response. The new ideas of cerebral dynamics, product of biopathologic thought, do not completely destroy the theory of cerebral localizations, but show the nonexistence of a general psychophysical specificity, even though each area of the brain may engrave upon the functional comportment a certain qualitative character.

Influenced by the ideas of Flourens, H. Jackson (1884) not only admitted the unity of normal and pathologic activities of the neuroaxis, but also a hierarchy or subordination, and above all, a dissolution of the functions or structures where pathologic disturbances are involved. That is, the cerebral lesions follow each other in all cases of dynamic effects. The double Jacksonian principle of hierarchy and dissolution, which orients psychiatric research along dynamic lines, was applied first by Von Monakow and Morgue (1928), then by Foix and Lhermite, and finally by F. Ey and J. Rouart (1938). Jackson professed that four facts, which influence one another, intervene in the pathogeny of psychoses: (1) the different depths of dissolution of the highest cerebral centers; (2) the quality of the personalities that have undergone said dissolution; (3) the different speeds at which the dissolutions take place; and (4) the influence of the different external circumstances on persons who have suffered said dissolutions. The importance of the Jacksonian dynamic conception of psychosis rests on the fact that he disregards the close dependence of the syndrome on the lesion.

The dynamic conception of psychic life is greatly developed in the biologic theory of Von Monakow and Morgue, investigators who followed up the evolution of psychic functions in the direction of a reciprocal integration of the sphere of causality and the sphere of the instincts. The aforementioned scientists say that any nervous function is inseparable from the given form of the instinctive activity and that the time factor must be considered in its development, a neurologic development of the function which precludes assigning to it an absolutely rigorous local sign, since the maturity of the function is not possible without a cohesion in all the centers of integration. In the dynamic conception of Monakow a part is played by the phenomenon which he calls diaschisis, which means that the effects of a local nervous lesion extend to the totality of the encephalus along well-defined lines, and, from a distance and in the direction of the interrupted fibers of its functioning, there occurs a series of incomprehensible phenomena through a focalist conception of the nervous system.

However, the focalistic conception of the psychoneurologic syndromes persisted with psychiatrists until the ideas of K. Goldstein were divulged to the scientific world. More attention was then given to the idea that in cerebral pathology it is not a question of a juxtaposition of symptoms, but of functional systems forming a whole, which manifest themselves through different symptoms in the most diverse areas. Goldstein divides the symptoms into two categories, depending on whether it is a matter of responses of the organism to the questions arising out of an abnormal situation, or the special questions which the observer asks himself. The results of Goldstein and Gelb's method of observation in patients suffering from cortical brain traumas can be synthesized in the following conclusions: (a) functions or functional areas never disappear singly, but all the functions are

always affected, even though each one of them may be affected to a greater or lesser degree; (b) a functional power does not totally disappear in any case, since single functions persist, and as the apparently identical reactions do not disappear in all circumstances, there will exist a lability of the reactions to the same requirements, reactions formerly attributed to general disturbances like fatigue; (c) disturbances which manifest themselves in different areas are all of the same nature and the symptoms must be interpreted as the expression of the same fundamental modification; and (d) the essential modification can be characterized as the disturbance of given fundamental conduct which can be formulated in the following manner—the patient has lost the ability of adapting himself to possibility. That is why the patient fails every time imagination must anticipate action; that is why, in order to do anything, he must take his eyes off reality, and achieves the desired result only when he can arrive at it through a concrete action with the aid of an object that can be manipulated. As for the positive point of view in the behavior of the subsistent functions in a patient whose brain has been injured, Goldstein introduces two enlightening ideas, that of ordered comportment and that of catastrophic comportment, which are of great value in the interpretation of certain psychopathologic reactions in processual psychic patients.

GONZALO'S THEORY OF CEREBRAL DYNAMICS

The research done by Gonzalo, Cajal's disciple who was inspired by Goldstein and Gelb, with patients suffering from brain traumas, led to original conclusions which represent a definite step from the static concept to the dynamic concept of cerebral activity, showing the correlation and unity of the brain system. Gonzalo proceeded to explore quantitative functions besides the qualitative currently used, and he confirmed that precise, well-determined symptoms do not exist in correlation with the pathologic focuses. A very slight lesion of the left parieto-occipital region gives rise to a general and uniform alteration of the entire brain, from one hemisphere to another, responding to special dynamic conditions of the cerebral activity.

Gonzalo has likewise proved that the clinical study of the syndrome in patients suffering from cerebral lesions does not allow for locating the lesion exactly, since it is not a matter of the juxtaposition of symptoms, but rather that the cerebral lesions have repercussions over the entire organism in conformity with given laws of the nervous organization. Following upon a brain lesion, the functions exercised by the organ alter in given order, independently of the anatomical type of lesion, a merely functional order, and exclude functions according to their complexity. The brain lesion does not lead to symptomatic chaos as would occur if the theory of cerebral localizations held, but what happens is only a degradation or simplification of the cerebral function in such a way that the difference between the normal and the pathologic is exclusively qualitative.

Although the results of Gonzalo's investigations are disputable, when bracketed with Goldstein's they place psychiatric research along paths very different from those of former days and point to new systems for the interpretation of the therapeutic results of incisions of the white substance of the brain; profusely squandered at present because no exact idea of its indications exists.

Research in cerebral dynamics has not completely destroyed the doctrine of cerebral localizations, but it has destroyed psychophysical specificity in cerebral symptomatology, since the total reaction is of more importance than the symptom, as our clinical investigations show.

PERSONAL CLINICAL INVESTIGATIONS

The author's records include 900 cases of brain injury suffered from grapeshot or bullets, most of whom underwent surgery for the extraction of intracranial foreign bodies. In 14.47 per cent of these cases there were no appreciable psychic disorders, notwithstanding the evident cerebral lesion. Likewise, it was observed that the symptoms resulting from a given focal lesion do not always correspond to those symptoms characteristic of the cerebral region suffering from the lesions, since the focal lesions produce only isolated symptoms when they are located subcortically and cut the brain off from the external world. In the post-traumatic cerebral syndromes we always find neurologic and psychic symptomatologies closely related, although general comportments which do not respond to given localization of the lesions are not excluded.

In variable percentage (between 45 and 75 per cent, according to the situation of the lesion), we find neurovegetative disturbances which we include under the label neurovegetative dichotomy, meaning that the cortical lesions in some way exclude diencephalic participation, although the lesion may be limited and not at all deep. However, one may be sure that almost all patients suffering from brain injuries suffer from characterologic disturbances to which we have given particular attention, dividing them into attitudes and behavior patterns.

For the study of the attitudes of patients suffering from cranial injuries, we have availed ourselves of Kretschmer's classification of infravalorated, hypervalorated and autistic and to which we have added the apathetic. The frequency of occurrence for each varies according to localization, as may be seen in the following table.

TABLE I

Attitudes in Patients with Brain Injuries

Location of Lesion	Hypervalorated	Infravalorated	Autistic	Apathetic
Frontal	10%	40%	30%	10%
Parietal	8%	28.50%	37.50%	19%
Temporal	—	26.66%	26.66%	20%
Occipital	—	20%	73.25%	—
Frontoparietal	6.93%	35.39%	15.39%	20%
Temporoparietal	12.50%	52.50%	25%	60%
Parieto-occipital	7.50%	37%	52.50%	13.75%
Temporo-occipital	—	26.66%	40%	26.66%
Fronto-occipital	25%	17%	42%	7.50%
Bipolar	—	26.66%	40%	16.66%

Thus, from the practical point of view we may speak rather of characterologic behavior patterns, since disturbances of the character are what patients suffering from brain traumas exhibit as a consequence of the psychophysical insufficiency caused by the lesion. We have delimited various types of behavior patterns which we called pithiatic, prolix, irritable and aggressive. The pithiatic behavior pattern refers to the production of hysterical symptoms and psychogenetic reactions, which are not to be considered directly dependent on cerebral lesions, but rather stem from a weakening of the regulation between the diencephalic ego and other activities. There consequently arise numerous somatopsychic excitements which operate on the impulses, sensations, stimuli, perceptions and representations, and which evolve towards clinical pathomimesis. The prolix behavior pattern follows the lessening of mental agility and capacity for combination, along with the increase of fatigability, and so the subject becomes prolix, perseverant, viscous, with all the characteristics of the anergic temperament. The irritable behavior pattern results from the cortical excitability and inseparable oxyesthesia and consequent esthenic reactions in patients oppressed by inferiority complexes, a mechanism which also gives rise to aggressive behavior pattern.

TABLE II

Behavior Patterns in Patients Suffering From Brain Injuries

Location of Lesion	Pithiatic	Prolix	Irritable	Aggressive
Frontal	10%	15.55%	65.55%	15.55%
Parietal	12%	8%	61%	—
Occipital	—	25%	73.25%	6.25%
Temporal	—	40%	13.13%	46.66%
Frontoparietal	15.39%	22.30%	70%	5.39%
Temporoparietal	7.50%	37.50%	80%	20%
Parieto-occipital	13.75%	26.25%	47.50%	7.50%
Temporo-occipital	16.66%	16.66%	60%	26.66%
Frontotemporal	7.50%	25%	57.50%	32.50%
Bipolar	10%	30%	56.66%	23.33%

Psychodiagnostic investigations with the Rorschach test have uncovered some curious surprises. The attitude towards the test is one of fear and mistrust in some of the patients suffering from cranial traumas (keep in mind that our exploration had a technical purpose) principally in subjects with extensive subjective disturbances. When they face the plates, they experience the sensation of something unknown which stuns them, and they do not react until they recover from this transient stupor. In certain cases these patients do not see the plates as they are; their psychic vision is so myopic that they do not realize the symmetry of the plates, and produce answers on only one of the sides. The number of answers is relatively smaller than the number observed in the other psychoses, with a long reaction time and with very rare chromatic shocks. Originality is very scarce or when it runs too high, suspect. The psychogram proves that the lesion of the temporal lobule is what least destroys the personality of the subject, which is quite the opposite from lesions of parietal and frontal lobules.

The limits imposed on the present essay prevent our lingering on other series of particularities which we have had the opportunity to observe in sufferers from cranial wounds, and which show that neurologic investigation is as incapable of solving etiopathogenic psychiatric problems as the schools we have discussed.

THE CONSTITUTIONALIST TENDENCY

The notion of the inheritability of psychic illness, or, better yet, of the predisposition to it, is reinforced by the results of statistical and genetic investigations. Firstly, the Italian school of Padua (Giovani, Viola, Pende), and then the investigations of Kretschmer, have demonstrated the correlation of the temperamental psychologic qualities with the morphologic, and the predisposition of each biotype to suffer from a given endogenous psychosis. The constitutional manic depressive, schizophrenic, and epileptic circles have a certain fully confirmed clinical reality, as does the correspondence with the bodily, pyknic, leptosomic, and athletic figures respectively. However, notwithstanding the many facts contributed by the constitutionalist school in favor of the importance of constitutional factors, we still do not have a satisfactory and definitive explanation about the essence of the psychic illness. We do not know whether a predisposition to psychosis is transmitted through a sick gene or a special disposition of the germ plasma.

CONCLUSION

What path are we to follow in psychiatric research? In our opinion, we should stand free of any scientific sectarianism which may lead to theoretic prejudices and enslave thought in the interpretation of clinical psychopathologic phenomena. I conceive of psychic illness as a general somatosis of cerebral localization because that concept permits me to use, at the same time, facts contributed in its favor by the physiopathologic, neurologic, and psychologic schools without deviating from my conviction about the validity of the facts contributed by the Kretschmerian school. And I am so wary of doctrinal sectarianism that, although I am a convinced constitutionalist, I have challenged more strongly than other scientists the dogma of the fatality of the inheritance of psychic illnesses, a dogma which underlies governmental measures for the asexualization of mental patients. I am especially careful not to affiliate myself with philosophic or psychologic doctrines which may lead either to a psychiatric metaphysicism as with existentialism, or to an absurd dynamic interpretation of the totality of psychoses as does the Freudian school.

The eclecticism which I profess does not prevent me from following a given orientation in research, since, although I am attracted by the most divergent theories, psychiatric research must pursue concrete and well-defined objectives, principally etiopathogenic and nosographic. We have to find the solution not only for empirical problems of interest to the clinician but also to problems of interest to the scholar, which in our specialty are in themselves of supra-empiric nature. Observation and experimentation constitute the fundamental bases of psychiatric research, as in all medical sciences, and the man working at research in psychiatry cannot lose sight of that.

RESUMEN

Basado en su experiencia personal, estudia el autor críticamente las corrientes teóricas que presiden en España la investigación clínica psiquiátrica. La orientación *filosófica antropológica* ha aportado escasos progresos a la Psiquiatría, con el peligro de orientar los psiquiatras hacia el metafipsiquismo; empero, el auge del existencialismo y la invención del *análisis existencial*, apoyan una investigación antropológica que ha permitido el estudio de ciertas vivencias esquizofrénicas, principalmente delirantes primarias. La *fenomenología psiquiátrica* constituye el mejor de los métodos de investigación psicopatológica; pero si explica el desarrollo de los sucesos psíquicos, en cambio ningún indicio aporta sobre las causas de sus trastornos patológicos. La noción de que las psicosis son somatosis de localización cerebral justifica la investigación *fisiopatológica* psiquiátrica, pues si bien es cierto que todavía ignoramos el substrato biológico de las psicosis endógenas, el estudio de las alteraciones de las secreciones internas, de los disturbios físicoquímicos y de los trastornos metabólicos, unidos a los progresos de la electroencefalografía, nos ponen en camino de establecer una relación etiopatogénica de las psicosis. La Escuela *anatomoneurológica* focalista se halla en plena decadencia, no obstante los esfuerzos de Kleist, pues en la actualidad impera una *mentalidad biopatológica* que desinteresada de la localización de la lesión cerebral se preocupa principalmente de las reacciones globales de la personalidad, ya que en patología cerebral no se trata de yuxtaposición de síntomas, sino de sistemas funcionales formando un todo, como lo demuestran los denominados comportamientos ordenado y catastrófico de Goldstein. Las investigaciones sobre dinámica cerebral de Gonzalo orientan la investigación anatomoneurológica por nuevos derroteros, que pueden explicar los resultados de las lobectomías.

El autor ha estudiado 800 heridos cerebrales y como resultado de sus investigaciones presenta cuadros estadístico en que resume las *actitudes de la personalidad* y los *comportamientos caracterológicos* según la localización lesional. Dichos heridos se han estudiado también mediante el psicograma de Rorschach, obteniéndose interesantes conclusiones.

La escuela *constitucionalista* ha demostrado la importancia de la herencia y de la predisposición en la etiología de las psicosis; pero todavía ignoramos si se transmite un gene morboso o una disposición especial del plasma germinal.

El psiquiatra debe ser ecléctico y apartarse de cualesquiera sectarismos científicos en la interpretación de los hechos clínicos. La investigación psiquiátrica tiene que perseguir finalidades concretas y buscar soluciones tanto para los problemas empíricos que interesan al clínico como a los de naturaleza supraempírica que interesan al sabio.

RESUME

S'appuyant sur son expérience particulière, l'auteur étudia judicieusement les théories de l'investigation clinique psychiatrique qui existent actuellement en Espagne. L'orientation *philosophico-anthropologique* a apporté peu de progrès à la Psychiatrie, avec le danger d'orienter les psychiatres vers la métaphysique; cependant, l'apogée de l'existentialisme et l'invention de *l'analyse existentielle* ont appuyé l'investigation anthropologique, ce qui a permis l'étude de certains "vivencias" schizophrènes, principalement les délirants primaires.

La *phénomènologie psychiatrique* constitue la meilleure des méthodes d'investigation psychopathologique; mais si cela explique le développement des évènements psychiques, d'autre part n'indique pas les causes des dérangements pathologiques. La notion que les psychoses sont des affections somatiques de localisation cérébrale justifie l'investigation *physiopathologique* psychiatrique, car même si nous ignorons le substratum biologique des psychoses endogèniques, l'étude des changements des sécrétions internes, des dérangements physicochimiques et des troubles métaboliques aide à l'avancement de l'électroencéphalogramme, et nous met en voie d'établir une relation étiopathogénique des psychoses. L'école *anatomoneurologique* focale se trouve en pleine décadence, en dépit des efforts de Kleist, car en l'actualité la *mentalité biopathologique* qui règne se désintéresse de la localisation de la lésion cérébrale, se préoccupant principalement des réactions globales de la personnalité, étant donné qu'en pathologie cérébrale on ne traite pas de juxtaposition des symptômes, mais des systèmes fonctionnels formant un tout, comme le démontre les conceptions de Goldstein d'une conduite ordonnée et catastrophique. Les recherches de Gonzalo sur les dynamiques cérébrales orientent l'investigation anatomoneurologique vers de nouveaux sentiers, ce qui aidera peut-être à expliquer les résultats des lobectomies.

L'auteur a étudié 800 patients avec blessures cérébrales et comme résultat de ses investigations, présente des statistiques qui résument les *attitudes de la personnalité* et les *conduites caractérologiques* selon la localisation de la lésion. Ces cas ont été étudiés aussi avec l'aide de l'épreuve de Rorschach, donnant des conclusions intéressantes.

L'école *constitutionaliste* a démontré l'importance de l'héritage et de la prédisposition dans l'étiologie des psychoses, mais toujours ignorant si se transmet un gène morbide ou une disposition spéciale du plasma germinal.

La psychiatrie doit être éclectique et détachée de tout autre groupe scientifique dans l'interprétation des faits cliniques. L'investigation psychiatrique s'en tient à la poursuite de fins concrètes et à la recherche de solutions aux problèmes empiriques qui intéressent la clinique tout comme ceux de nature supraempirique qui intéressent le scientiste.

Sensitivity in Insulin Coma Therapy*

Albert E. Scheflen, M.D.†
Elliot R. Reiner, M.D.

MASSACHUSETTS DEPARTMENT OF MENTAL HEALTH
DIVISION OF MENTAL HYGIENE, RESEARCH SERVICE
WORCESTER STATE HOSPITAL, WORCESTER, MASSACHUSETTS

The insulin therapist who manages dosage and observes the patient's sensitivity to insulin is faced with many puzzling phenomena. As therapy progresses the patient is likely to require less insulin, an effect termed sensitization. There are extreme individual and day to day variations in dose requirements and depth of coma. In using the zigzagging maneuvers of Von Braunmühl,[1] the clinician finds that coma may follow a reduced dose when higher doses have been ineffective. He may notice that dose requirements are affected by day of the week, resistance of the patient, or by room temperature. These phenomena lack adequate explanation, and not many descriptions have been published. A few authors describe patterns of sensitization,[1, 2] but usually sensitivity is merely mentioned or exceptional cases are reported.[2, 4, 5, 6, 7]

The vast literature on the physiology of hypoglycemia might be profitably applied to clinical practice. Many studies are especially pertinent.[8, 9, 10, 11, 12] Except for Gellhorn[13] few authors correlate physiologic and clinical experience. Heilbrunn and Liebert[14] offer the valuable suggestion that lower dosage may result in more satisfactory coma since the hyperglycemic effect of adrenalemia is not elicited. Many clinicians meet the variable problems of refractoriness by arbitrary manipulations or stereotyped routines. Factors other than absolute insulin dose are often ignored. An improved rationale of therapy is needed, and the results of this particular study allow a step in that direction.

METHODS

The subjects were 100 schizophrenic patients successively treated with insulin coma therapy with fifty comas constituting a course. Excluded were those with definitive physical disease, significant untoward reactions, insufficient clinical data, or uncertain improvement. There remained 37 women and 30 men. The group included the 24 male patients previously studied.[15] An analysis of psychiatric factors is published elsewhere,[16] and the method of assessing improvement is described in a companion study.[17] Supervising the insulin unit were several physicians, not the authors, who differed in their methods. This resulted in diverse, sometimes unusual methods of dose administration, which precluded certain

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* This is the second in a series of three articles.

† Dr. Scheflen's present address is 111 N. 49th St., Philadelphia, Pa.

statistical assessments but gave an opportunity to contrast and study the effect of methodology. Insulin was not given intravenously and adjunctive medications were avoided. Dose, depth of coma, time intervals, vital signs, and other clinical factors were measured and analyzed as previously described.[15] To measure sensitivity to insulin the authors used: (1) the insulin dose effecting coma; (2) the frequency of treatments unsuccessful in producing coma, expressed as a coma: treatment ratio; and (3) the depth of coma or the frequency of third stage coma. As will be seen these factors affected one another: measures (1) and (2) correlated positively; (1) and (3) negatively.

RESULTS

I. THE INITIAL REFRACTORY PHASE AND "SENSITIZATION."

The first coma usually occurred between the fifth and eighth treatment, but was seen as early as the third and as late as the twenty-third treatment. The first coma occurred with *exactly equal* frequency at any dose between 200 and 1000 units, and the first coma often occurred after dose was lowered. It seemed necessary to deplete physiologic forces resisting hypoglycemia by the stress of repeated daily insulin injections; until this was done no dose, however large, effected a coma. Once coma was produced it occurred regularly in most patients. The size of the dose in use at this point depended upon two related factors: (1) the number of days before the first coma could be effected, and (2) the rate at which the clinician had been increasing dose to effect it. For example, one physician raising dose by 25 unit increments might effect the first coma at about 200 units, while another, using increments of 250 units, might find the patient at a dose level of 2000 units when coma first occurred. In general, once comas had been produced, they recurred at doses previously ineffective, continued to occur despite dose reductions, or were progressively deeper at the same dose. This effect has been termed sensitization.[2] Its character depended upon how high, or possibly how excessive, previous doses had been. In the initial refractory period, while physiologic resistances are being depleted, the doses selected influence subsequent sensitivity to insulin and the sensitization effect. By the fifteenth coma most patients showed relative stability in the relations of dose to depth of coma. A few patients were not stabilized at any time.

II. LEVELS OF SENSITIVITY.

The frequency curve for mean insulin dose in the first 20 comas was bimodal (Figure 1). The lowest frequency is at the interval, 250–300 units. Only two patients had adequate coma reactions at doses between 275 and 350 units. Sixty-one per cent of the times that this dose level was tried coma did *not* result. The corresponding figure for the dose level 200 to 275 units was 12 per cent; and for the level 350 to 425 it was 33 per cent. To obtain deep comas, it was generally necessary to use a dose between 100 and 250 units or else to raise dose to about 400 units. Later in treatment the bimodal curve disappears and these effects are less pronounced, the insulin dose of most patients having been reduced to less

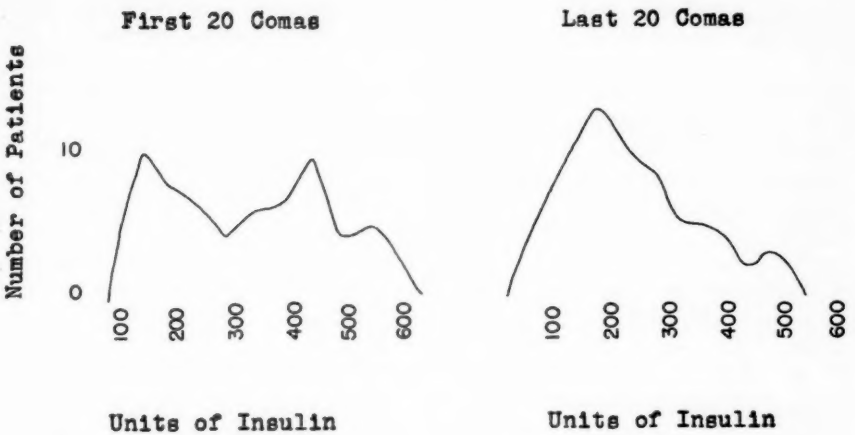

FIGURE 1. Frequency curves for the mean insulin dose; the first and last 20 comas compared.

than 275 units. *There appeared to be two levels of sensitivity: a lower level below 250 units, and an upper level above 400 units.* Phenomena of coma differed according to these levels. The clinician partly determined the level of sensitivity, and, therefore, the characteristics of coma and sensitivity.

III. THE RELATIONSHIPS OF THE INSULIN DOSE.

The vital signs and the insulin dose were related. The mean insulin dose and the mean basal systolic blood pressure, measured before insulin injection each morning, were related in the 67 patients during the first 20 comas. This was most striking in women where the line of regression for mean blood pressure on mean dose was curvilinear (eta = .64; p = .05). The lowest mean blood pressures occurred at a mean dose of 350 units. Stated differently, the dose and preinjection systolic pressure correlated negatively ($r = -.50$; $p = .02$) at doses below 350 units, and positively ($r = +.75$; $p = .001$) at doses above 350 units, and also the diastolic blood pressure was similarly related to dose. Like the bimodal frequency curve this relationship tended to disappear as treatment progressed. In the initial refractory phase the preinjection blood pressure tended to increase each morning as insulin dosage was increased, and during sensitization the blood pressure often showed a striking decrease concomitant with dose reductions. Instances of marked, progressive increase in sensitivity were often accompanied by striking decreases day to day in preinjection blood pressure, body temperature, and/or the pulse rate.

The insulin dose and the systolic blood pressure during the treatment period were also positively correlated. Figure 2 shows this relationship during 250 unselected comas for both the mean and maximum systolic blood pressure readings.

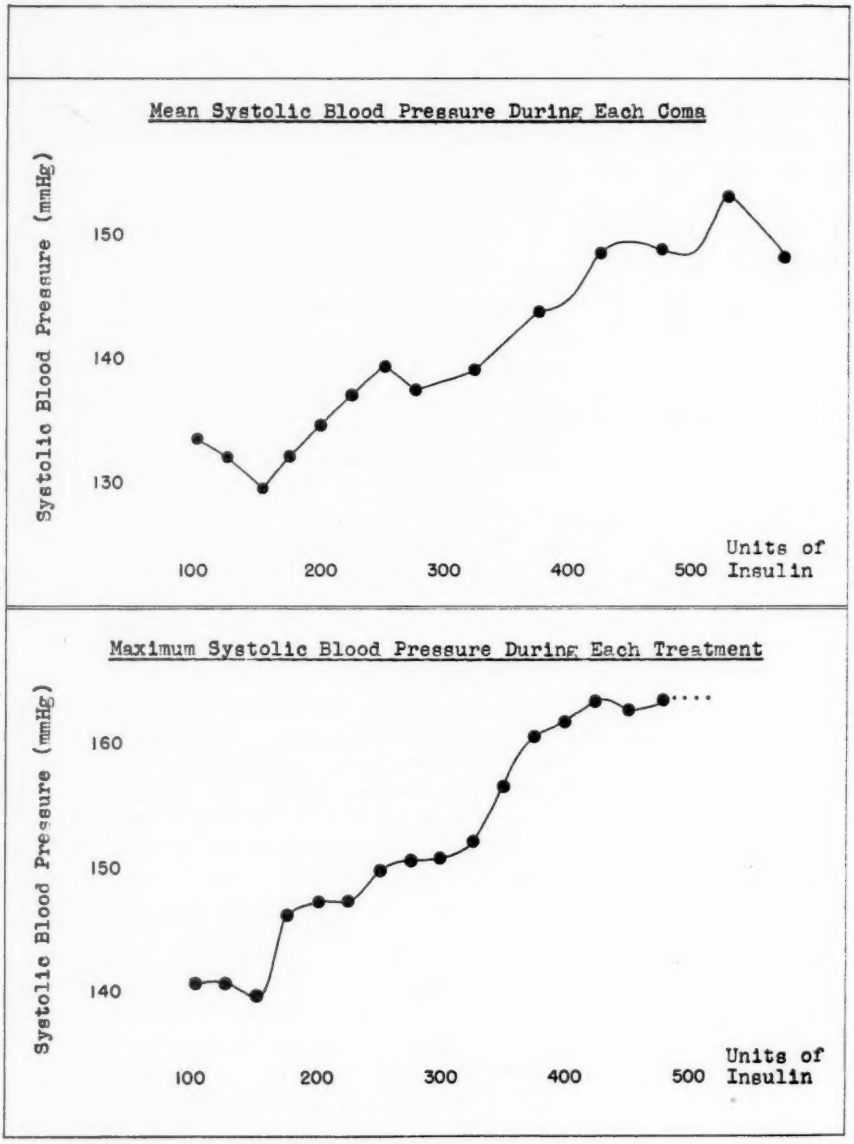

FIGURE 2. The relationship of systolic blood pressure to insulin dose (250 unselected comas).

There were similar, but statistically unreliable, relationships between dose and diastolic blood pressure and pulse rate. Temperature fall tended to be less marked with higher insulin doses.

The dose level and the type of coma were also related. At higher doses, comas were less satisfactory in depth and rapidity of onset. There were insufficient statistics at doses above 500 units. Below this the frequency of third stage comas and the mean insulin dose correlated negatively ($r = -.70$; $p = .01$). An analysis of variance of 1000 random comas showed that this is not due entirely to an increase in dose by the clinician on the day after a coma of inadequate depth but partly, at least, to the influence of dose itself. Analysis demonstrated that third stage comas were significantly more likely when the insulin dose was less than 250 units ($F = 8.4$; $p = .005$). At dose between 250 and 500 units, light coma was more probable.

The time *required for onset of coma after insulin injection* was also related to dose. Below doses of 450 units the correlation was positive ($r = +.52$; $p = .01$). This again was not simply due to increasing dose after comas with delayed onset, and the size of dose itself influenced the time of onset ($F = 3.4$; $p = .04$). Above 450 units the interval became shortened.

These related measures of sensitivity, time of onset and depth of coma, must indicate some aspect of physiologic resistance to hypoglycemia and coma, at doses between 250 and 500 units. It appears that resistance was increased, not decreased, as dosage was increased.

IV. THE CLINICAL CHARACTERISTIC OF SENSITIVITY.

Some markedly sensitive and markedly refractory patients often differed in some clinical characteristics which are summarized in Table I. Some of these characteristics may change

TABLE I

Comparison of Some Clinical Characteristics Often Seen in Markedly Sensitive and Markedly Refractory Patients

	Sensitive Patients	Refractory Patients
Physical Characteristics	Ectomorphy or endomorphy. Femininity in habitus, skin, or hair. Emaciation or poor nutrition.	Mesomorphy. Hirsutism, especially in women. Cushing's type of obesity.
Reaction to Treatment	Passivity, withdrawal, asthenia, listlessness, easy fatiguability.	Marked anxiety, paranoid dread, aggressiveness, resistiveness.
Type of Coma	Deep, rapid in onset, quiet with little muscular activity. Slow to termination. Parasympathetic predominance with hypotension, normal or slow pulse rate and profuse watery salivation.	Light, slow in onset, with overactivity and restlessness often terminating spontaneously. Sympathetic predominance with mild hypertension, tachycardia, and exophthalamos.

concomitant to a change in a patient's level of sensitivity, e.g., after sensitization. In a few patients who developed marked sensitivity there was concomitant development of the following: (1) increasing asthenia, apathy, or listlessness; (2) a fall in blood pressure, pulse rate, and/or body temperature as measured in the morning before insulin injection; (3) proneness to ecchymoses at the site of venipuncture or injury; (4) decrease of insulin dose below 50 units, and (5) progressively deeper coma with slow response to termination by glucose. This has been mentioned in fatal cases in a previous publication.[18]

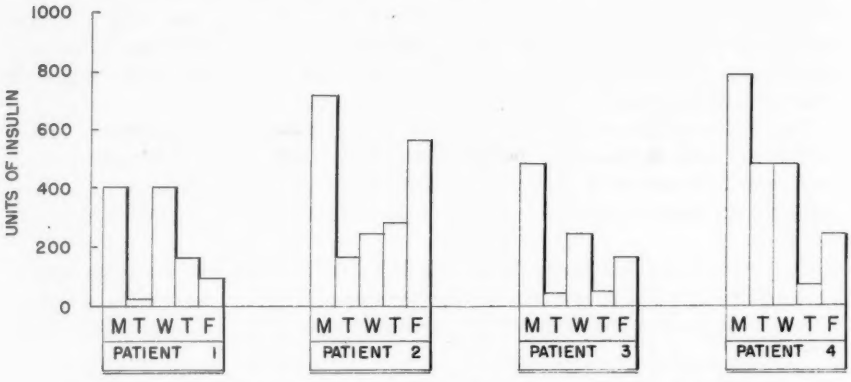

FIGURE 3. Graph of treatment week in 4 patients to show diversity of insulin doses which effected equally deep coma.

Marked variability is characteristic. The mean insulin dose for the group was 276 ± 129 units; the median 274 units. The highest mean dose for 50 comas was 670 units; the lowest 60 units. Some clinics regularly employ 3000 or more units and the repeated use of 6000 units has been reported to us. At the opposite extreme we have regularly produced deep coma with ten units of insulin, and one patient had subcoma reactions with fasting, sterile water, and suggestion. The mean coma: treatment ratio was 79 ± 8; the extremes 94 and 54. The mean per cent of third stage comas was 48 ± 15, with extremes of 12 and 88 per cent.

Day to day variations in the individual were also marked in the sensitization phase, but not in the relative stability phase. Within a brief period, for instance, five days of treatment, a wide range of insulin doses were often equally effective in producing deep coma. This is illustrated for 4 patients in Figure 3.

Sensitization, the progressive increase in sensitivity, is very common. In 55 per cent of patients there was a significant decrease in mean insulin dose after the first 20 comas. The mean change for the group between the first and last 20 comas was minus 20 ± 49 per cent. In one patient the dose decrease was 210 per cent. A study of the pattern of dose change in each patient revealed that every possible configuration occurred. Most common, however, were: (1) comas began at doses above 400 units and by the tenth to the fifteenth comas had been reduced to between 100 and 250 units; (2) comas began at 100 to 200 units and

were reduced only slightly through the rest of the treatment, and (3) comas began and continued at doses above 350 units. In other words, a patient could be maintained in the upper or lower level of sensitivity or could change from one level to another. These eventualities are influenced by dose selection. In the sensitization phase, sudden marked reductions of dose were often effective in producing coma as deep or deeper than was effected at the higher dose. For example, in one patient, doses on successive days were 450, 15, and 550 units with coma each day. Two patients had coma on 1000 units one day and 100 units a day or two later. Other dose reductions allowing as deep or deeper comas were: 700–200; 450–200; 800–200; 600–50; 500–150; 400–100; and 700–300 units. Of 77 instances in which dose was lowered on successive days by 200 or more units, the reduced dose effected equally deep coma in 51 per cent.

The "zigzagging" maneuver was likely to be successful as a method of lowering dose. This is not surprising since any attempt to reduce dose was likely to be successful as sensitization occurred. In 32 instances zigzagging was employed. Satisfactory coma at significantly lower doses resulted in 71 per cent of these instances. Characteristic of these successful instances was a reduction in dose from above 400 units to between 150 and 250 units, which occurred in 20 of the 23 successful instances. In other words, "zigzagging" or other dose reducing attempts were likely to be successful especially if the patient was at the higher level of sensitivity, and reduction was to the lower level between 150 and 250 units. Sensitization was not simply a physiologic phenomenon but was profoundly influenced by selection of insulin dose.

V. CLINICAL FACTORS AFFECTING INSULIN SENSITIVITY.

Some clinical factors in insulin sensitivity are summarized in Table II.

TABLE II

Some Clinical Factors in Insulin Sensitivity

Affecting the Entire Course	Method of Selecting Dose
	Psychiatric Improvement
	Hirsutism in Women
Affecting Individual Comas	Cooperativeness to Treatment
	Simultaneous electro-convulsions
	Low Environmental Temperature
	Stage of the Treatment Course
	Day of the Treatment Week
No Evident Effect	Age
	Sex
	Duration of Illness
	Subtype of Schizophrenia

1. *Dose Selection.* In many patients the insulin dose appeared to be unnecessarily high as a result of the policy of dose selection. The size of dose employed in the initial refractory period influenced the size of dose during the phase in which sensitization occurred. A dose selection was also a factor in determining level of sensitivity at which the patient subsequently remained. In 28 patients the mean dose remained above 300 units for 50 comas. In only 2 of these did the dose remain above 300 units despite two or more attempts to lower it. A study of this group revealed that the following technics at least contributed to the high dose level: (1) failure to try a lower dose (4 patients); (2) failure to try a lower dose until very late in treatment, e.g., doses below 450 units were not employed until after the fortieth coma although once-tried doses below 250 units proved adequate for the rest of treatment (eight patients); (3) the use of high doses when doses in the lower level of sensitivity had proven adequate, e.g., the use of above 500 units when doses of 200 units had each proved effective (two patients); (4) failure to use "zigzagging," or failure to use it in a manner contributing to lowering of dose (26 patients). A study of patients with a mean insulin dose below 200 units demonstrated the effective use of "zigzagging" and other attempts to reduce dose.

Insulin dose in many patients may have been unnecessarily high due to failure of the clinician to reduce it. The higher level of sensitivity with less satisfactory comas was reached or maintained in many cases by the clinical procedure. The dose level, then, was partly a product of method and not a reliable measure of physiologic resistance, and in turn the dose administered was a factor in the coma reaction and the physiological response underlying it.

2. *Improvement in Psychiatric State.* The unimproved patients required a mean dose of 296 ± 130 units; the improved 248 ± 124 units. The unimproved group had a coma: treatment ratio of 76 ± 9 per cent; the improved a ratio of 83 ± 7 per cent. The differences were statistically significant. Unimproved patients were more likely to be refractory to insulin. (These differences will be discussed in a companion paper.)

3. *Hirsutism in Women.* Seven women who were hirsute showed significantly greater refractoriness to insulin in all three indices.

4. *Cooperativeness to Treatment.* Uncooperativeness included marked overactivity, refusal to remain in bed during treatment period, unusually intense dread of or hostile attitude toward treatment, and "fighting off" coma. The cooperative group was insignificantly more sensitive to insulin in all three measures of sensitivity (cf. Methods). The first coma was more difficult to effect in the most uncooperative patients, and coma rarely occurred on days when a patient was markedly uncooperative. On days when the insulin unit was upset, for instance, after an altercation between patients, it was not infrequent that no patient had coma. On several occasions negativistic or paranoid patients organized cliques to resist treatment and for days no member had coma.

5. *Subtype of Schizophrenia.* The catatonic patients were insignificantly more refractory to insulin as a group. Most uncooperative patients fell into this group.

6. *Simultaneous Electroshock Treatment.* If an electroshock treatment was given in the morning during the early treatment phases with insulin, coma rarely occurred and depth

of coma was sometimes unsatisfactory the following day. No patient received more than five electroshocks during insulin, a number insufficient to influence the measures of sensitivity for 50 comas.

7. *Occurrence of Grand Mal Seizures.* After a grand mal seizure, coma usually terminated spontaneously, but seizures were too infrequent to influence sensitivity statistically.

8. *Season of the Year.* There were no differences in the indices between patients treated in winter and those treated in summer, but on several days when the insulin unit was cold no patient had coma.

9. *Day of the Treatment Week.* The probability of deep third or fourth stage coma was less on Monday and Tuesday than on Thursday or Friday, presumably due to the week end layoff ($F = 3.7$; $p = .05$; 1000 random comas). This was independent of the stage of treatment. The authors had previously observed in a Naval hospital insulin unit the opposite effect. Patients who had eaten poorly and had drunk much alcohol over a week end, had rapid hypoglycemic reactions to small doses on the following Monday.

10. *Stage of Treatment.* Dose tended to decrease, deep comas to be more frequent, and treatments without coma were less common as treatment progressed.

11. *Factors Not Related to Sensitivity.* There was no statistical relationship between the measures of sensitivity and age, duration of illness, or sex.

DISCUSSION

It is interesting to relate the phenomena of insulin therapy to the General Adaptation Syndrome of Selyi.[19] Insulin treatment is a stress and when repeated should lead either to exhaustion or adaptation. In occasional patients the marked refractoriness to insulin might suggest adaptation, and in a few patients exhaustion seems to occur. In a previous paper[18] we outlined a syndrome of increasing sensitivity, delay in response of coma to glucose termination, and decreasing blood pressure, pulse rate, and body temperature leading to fatal protracted coma. This development and some of the characteristics of very sensitive patients suggest the adrenalectomized animal,[19] or an exhaustion phase. The treatment of protracted comas with ACTH or cortisone has been reported to be successful.[20] The sensitization effect could, in part, be a developing exhaustion. In uncomplicated cases there may be established a balance between the stress of repeated hypoglycemia, tending to produce exhaustion, and other factors allowing reconstitution, such as regulation of dose and the week end rest period.

Heilbrunn and Liebert[14] assaying blood adrenalin, found none with deep, quiet coma, while the blood adrenalin levels were high when comas failed to occur or were shallow and restless. In such cases adrenalin was not detectable in subsequent comas after dose had been reduced. In this study the authors describe two levels of sensitivity (or resistance). At the lower level, when dose was generally less than 200 units, the clinical features did not show an epinephrine-like effect. At doses above about 300 units there was much clinical evidence of such an effect. In many patients the authors' measures showed greater sensitivity to insulin after a reduction in dose.

In a companion study,[15] the authors showed that the systolic blood pressure response during subcoma, presumably an epinephrine-like effect, is less marked after sensitization has occurred, the degree of this response being a function of dose (Interaction $F = 14.7$; $p = .001$). In that study it also was postulated that the pituitary-adrenal and sympathetico-adrenal defenses against hypoglycemia come into action successively. The present study seems to confirm Heilbrunn and Liebert[14] in the opinion that coma may occur without evoking a sympatheticoadrenal response at all. One condition for this appears to be use of a reduced dose of insulin. Since the clinician selects dose, the production of the more satisfactory comas of the lower level of sensitivity becomes partly a technical matter.

There are other deductions advancing a rationale of therapy. Sensitization is not simply a physiologic depletion, but is markedly effected by the doses used on preceding days. The "zigzagging" method of Von Braunmühl need not be empirical. In terms of the levels of sensitization the likelihood of success for the procedure can be increased by lowering dose from above about 400 units to below 250 units. Cold, dread, excitement, and other factors known to stimulate epinephrine, had the effect of increasing sensitivity. The dose range 300 to 350 units was singularly ineffective in producing satisfactory comas, presumably because the size dose stimulated an epinephrine-like defense it was inadequate to overcome. The vital signs and other clinical features may be useful in recognizing and controlling sensitivity.

Factors influencing insulin sensitivity can be summarized: (1) pathologic, such as pituitary-adrenal aberrations, evidenced by hirsutism, and signs or symptoms of hypocortical or Addisonian states; autonomic nervous system or hypothalamic abnormalities, and malnutrition, liver diseases, or other disorders affecting carbohydrate metabolism; (2) situational, such as dread of treatment, overactivity, resistiveness to treatment, cold environment, convulsions, or simultaneous electroshock treatments, and (3) methodological, such as excessive or inadequate doses, failure to try "zigzagging" or dose reductions, and interruptions of treatment with reconstitution of defenses. Many of these factors can be controlled or modified. In the initial refractory phase, dose must be adequate to exhaust defenses and prevent adaptation. Later, the clinician steers a course between exhaustion and refractoriness by manipulation of these factors.

SUMMARY

Insulin sensitivity was studied in 67 schizophrenic subjects, and the treatment course was divided into phases. Clinical phenomena related to dose levels were mentioned. The insulin dose correlated with the frequency of deep comas, the time interval between injection and onset of coma, and the vital signs. The frequency curve for mean insulin dose was bimodal. The data indicated that there were two levels of insulin sensitivity: at the lower level deep comas, more rapid onset, and treatments effecting coma were more frequent.

The role of the neurogenic component of the general adaptation syndrome was postulated, and the higher level of sensitivity was assumed to be due to epinephrine-like stimulation.

Variability in dose, sensitization, "zigzagging" and other manipulations were discussed from this viewpoint.

Selection of higher doses of insulin stimulated the epinephrine-like effect with greater insulin resistance. Other clinical factors related to insulin sensitivity were analyzed. Policies of dose manipulation that seemed ineffective were discussed. Since these clinical factors are modifiable and effect sensitivity, suggestions for improved rationale of management were deduced.

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RESUMEN

Se estudia la sensibilidad a la insulina en 67 sujetos esquizofrénicos, dividiéndose en dos fases el curso del tratamiento. Se estudian los fenómenos clínicos relacionados con los diferentes niveles de las dosis. La dosis de insulina estuvo correlacionada con la frecuencia de comas profundos, el intervalo de tiempo entre la inyección y la iniciación del coma, y los signos vitales. La curva de frecuencia de las dosis medias de insulina, dió los grupos de valores. Los datos indicaron que existían dos niveles de sensibilidad a la insulina: En el nivel de coma más profundo, fueron más frecuentes los comienzos más rápidos y los tratamientos determinantes de coma.

Se destaca el papel del componente neurogénico del síndrome de adaptación general, considerándose que el más alto nivel de sensibilidad se debe a una estimulación similar a la de la epinefrina. Se examinaron desde este punto de vista, la variabilidad en la dosis, sensibilización, "zig-zagueo" y otras manipulaciones.

La selección de dosis mayores de insulina, estimuló el efecto similar al de la adrenalina con mayor resistencia a la insulina. Se analizan otros factores clínicos relacionados con la sensibilidad a la insulina y se discute el modo de regular dosis que al parecer eran ineficaces. En vista de que estos factores clínicos son modificables y producen sensibilización, se indican diversas sugerencias para mejorar el tratamiento.

RESUME

La sensibilité à l'insuline a été étudiée chez 67 schizophrènes, le cours du traitement étant divisé en phases. L'étude fait mention des phénomènes cliniques relatifs aux différents niveaux des doses. La dose d'insuline correspondait à la fréquence des comas profonds, l'intervalle de temps entre l'injection et l'initiation du coma, et les signes vitaux. La courbe de fréquence des doses moyennes d'insuline était bimodale. Les données ont indiqué qu'il existe deux niveaux de sensibilité à l'insuline: au plus bas niveau, des comas profonds, d'emblée plus rapide, et les traitements produisant le coma étaient plus fréquents.

Le rôle du composant neurogénique du syndrome d'adaptation générale a été établi, et

on présume que le plus haut degré de sensibilité est du a une stimulation semblable à celle de l'épinéphrine. On examina de ce point de vue la variabilité dans la dose, sensibilisation, "zigzag" et autres manipulations.

La sélection de fortes doses d'insuline ont activé l'effet semblable à l'épinéphrine avec une plus grande résistance à l'insuline. On analysa d'autres facteurs cliniques relatifs à la sensibilité à l'insuline et on discuta le moyen de régulariser les doses qui semblent inefficaces. Puisque ces facteurs cliniques sont modifiables et produisent la sensibilisation, la nécessité de diverses suggestions pour une meilleure thérapie est indiquée.

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The Relationship Between Psychiatric Improvement and Certain Pathologic Changes in the Rorschach During Electroconvulsive Therapy

Jules D. Holzberg, Ph.D.
Eleanor R. Cahen

PSYCHOLOGICAL LABORATORIES, CONNECTICUT STATE HOSPITAL
MIDDLETOWN, CONN.

Although the shock therapies have been utilized in clinical psychiatry for more than ten years, "the therapeutic action of shock treatment is still obscure . . . at present we can only say that we are treating empirically disorders whose etiology is unknown with shock treatments whose action is also shrouded in mystery."[6] While there is little known concerning the basis for the therapeutic success of shock treatment, there has been considerable research dealing with the psychiatric, medical, neurologic, and physiologic effects of this treatment.[6] However, there have been fewer psychologic investigations in the field of shock therapy than might have been expected, and most of these have been oriented toward determining intellectual deficit or defining psychologic criteria for prognosis. While many of these psychologic investigations have been conducted with an experimental design that compared the performance of patients on psychologic tests before and after a course of shock treatments,[2, 4, 7, 8, 14, 18, 19] some research has also been directed toward psychologic phenomena occurring immediately after a specific convulsion in the different shock treatments.[1, 10, 11, 12, 21, 22]

There have been many theories advanced to explain the therapeutic action of electroshock treatment, but little research has been directed toward testing these theories, primarily because they have not been structured in a testable form.[9] For the most part, the theories have been vague and speculative. Some of the theories have rested on an organic explanation, while others have strongly emphasized a psychogenic one. Myerson has attributed the success of shock treatment to the memory difficulty so often seen during and after this therapy. He states that the ". . . mechanism of improvement and recovery seems to be to knock out the brain and reduce the higher activities, to impair the memory, and thus the newer acquisition of mind, namely the pathological state, is forgotten. As the brain recovers, the well established trends—those which are relatively normal—come back, but the incubus of more recent evolution with less roots—so to speak—of thinking, feeling, and doing, remains away."[17] Mosse[15] presents a parallel psychologic theory which attributes the success of shock treatment to a "battering down" of the defense mechanisms established by the individual in the pathologic state.

The present research emerged from the clinical experience of the authors when several clear-cut depressed patients were referred for psychologic study while undergoing shock treatment. It was observed that the Rorschachs of these patients were atypical for depressions and resembled more a disorganized schizophrenic picture. Because of the obvious clinical evidence of depression, it was felt that the disturbance in the Rorschach records was related to the shock treatments. Since depressions have generally been found to be responsive to shock treatment, these observations together with the theoretical explanations of Myerson[17] and Mosse[15] suggested a relationship between pathologic personality changes during treatment and psychiatric improvement.

The present investigation is an exploratory study aimed at testing the hypothesis that recovery from shock treatment is associated with pathologic personality changes during the treatments.

SUBJECTS

Twenty subjects were used in this study. Of these, 11 were men and 9 were women. They ranged in age from 19 to 62, with a mean of 37.2. (Table I.) The patients were all recent admissions to the hospital, either for the first time or as readmissions; electroshock therapy was started soon after their present hospitalization. An attempt was made to include in the sample group some patients for whom the prognosis was considered poor, e.g., simple schizophrenics, as well as patients who were expected to show some recovery, e.g., depressives. Table I indicates the diagnostic categories included in the sample. Half of the patients had a mood disturbance while the other half revealed a primary thought disorder. The patients' period of illness ranged from 10 days to 27 years. (Table I.)

EXPERIMENTAL PROCEDURE

The present study utilized the Rorschach as the experimental testing instrument. The number of electroconvulsive treatments varied from 14 to 24 with a mean close to 19. The treatment was the standard Offner method. Therapy was administered on alternate days, three times a week. Each patient was given a Rorschach test shortly before the shock treatments were instituted. Following the pretreatment Rorschach, a Rorschach was obtained after the first electroshock, and then after every third treatment, i.e., following the 1st, 4th, 7th, etc. shock. Thus, each patient was tested once a week until his treatments were completed. In order to minimize the degree of postshock confusion entering into test performance, testings took place on the days between treatments. Although several psychologists administered the Rorschachs, the scoring of the data was exclusively handled by one of the experimenters.

To obtain an evaluation of each patient's clinical improvement immediately following the course of treatments, the psychiatrists were asked to rate their patients on a six-point rating scale. This scale was familiar to them since it had been previously utilized by them in another study.[13] Each patient's rating is indicated in Table I.

TABLE I

Ages, Years of Illness, Diagnoses, Number of Treatments, and Psychiatric Ratings of Subjects

	Patient	Age	Duration of Illness	Diagnosis	Number of Treatments	Psychiatric Rating
1.	A.D.	25	1 year	Schizophrenia, Paranoid	20	Recovered
2.	S.S.	42	10 days	Involutional Psychosis, Melancholia	20	Recovered
3.	S.T.	36	1 month	Manic-Depressive, Depressed	19	Recovered
4.	V.C.	41	21 days	Manic-Depressive, Manic	20	Markedly Improved
5.	W.C.	62	10 months	Involutional Psychosis, Other Types	20	Markedly Improved
6.	H.L.	41	1 year	Manic-Depressive, Depressed	20	Markedly Improved
7.	C.S.	19	1 year	Schizophrenia, Paranoid	17	Markedly Improved
8.	A.S.	24	8 years	Schizophrenia, Simple	17	Markedly Improved
9.	J.S.	29	15 years	Manic-Depressive, Depressed	20	Markedly Improved
10.	W.S.	42	14 months	Manic-Depressive, Depressed	19	Markedly Improved
11.	A.K.	22	1 month	Schizophrenia, Other Types	16	Markedly Improved
12.	J.W.	47	2 months	Involutional Psychosis, Melancholia	20	Markedly Improved
13.	C.C.	32	3 years	Schizophrenia, Hebephrenic	15	Moderately Improved
14.	C.Z.	53	1 month	Schizophrenia, Paranoid	20	Moderately Improved
15.	J.C.	34	7 years	Schizophrenia, Simple	14	Slightly Improved
16.	A.C.	37	17 years	Schizophrenia, Simple	20	Slightly Improved
17.	E.A.	34	1 year	Psychoneurosis, Reactive Depression	16	Slightly Improved
18.	M.D.	51	14 years	Manic-Depressive, Manic	20	Slightly Improved
19.	D.D.	51	27 years	Schizophrenia, Paranoid	20	Slightly Improved
20.	F.K.	22	6 months	Schizophrenia, Hebephrenic	24	Unimproved

On the basis of these ratings, the experimenters classified the patients into 2 groups, an improved group and an unimproved group. In the improved group were placed those patients rated by psychiatrists as "recovered," "markedly improved," and "moderately improved." Patients rated as "slightly improved," "unimproved," and "worse" constituted the unimproved group. Of the 20 subjects involved, 14 were thus categorized as improved while 6 were classified in the unimproved category.

TREATMENT OF DATA AND RESULTS

After all Rorschachs were scored, they were rated on the Munroe check list.*[16] Included in the check list are indices for the usual location categories, determinants, some content analysis, significant ratios and test behavior, i.e., rejections. Twenty-two items from the list were applied to the data.† The criteria of the check list were not applied in an approximate fashion, as Munroe suggests using them, but rather were stringently used.

* The authors wish to express their appreciation to Lillian Belmont for her assistance in rating the Rorschachs on the Munroe check list.

† Munroe has 28 items in her check list. Six of these items were not used in the present study because they were not readily applicable to the data. These items are number of responses, total reaction time, succession, original responses, shading shock, and color shock.

The Rorschachs were rated for the degree of pathology present on each of the 22 items on the check list. By comparing a subject's preshock ratings with his postshock ratings, it was possible to determine the specific items showing a change in the degree of pathology. For the purpose of this study, a pathologic change in an item is defined as any change in an abnormal direction occurring at any point in the treatment using the preshock rating as the base for measurement. For each subject, only one pathologic change in an item was considered, even though an item may have shown fluctuation. The maximum number of pathologic changes for any subject was 22.

TABLE II

Difference in Mean Pathologic Changes Between Improved and Unimproved Groups

	M	σDM	*t*	P
Improved	9.4	1.85	2.22	.05
Unimproved	5.3			

The number of psychologic changes for each subject was the number of items on the check list showing a change in an abnormal direction. In testing the hypothesis that successfully treated shock cases show more pathologic changes during treatment than those who do not improve, a comparison was made between the mean number of pathologic changes for each group.

For the improved group, there was a mean of 9.4 pathologic changes, while in the unimproved group the mean was 5.3. Using the *t*-test of significance, the difference between these means lies at the 5 per cent level of confidence; this difference could have occurred by chance only 5 times out of 100. (Table II.)

A second analysis was done comparing the improved with the unimproved group on pathologic changes in specific Rorschach factors. The percentage of patients in each group showing a pathologic change in each factor was determined. *t*-tests of the significance of differences between percentages were performed. (Table III.) Six factors out of the 22 were found to be significant or to approach significance.

The results indicate that one factor, range of content, is significant at the 1 per cent level. The popular response item is significant at the 5 per cent level. There were four factors which approached the 5 per cent level of significance: unusual details, space responses, animal movement, and inanimate movement. The trends for most of the nonsignificant factors were in the direction of more pathologic changes for the improved group.

During the course of this analysis, it was noted that some of the subjects showed fluctuations in their performance, i.e., a subject would first show a pathologic change at one testing, there would be improvement at a subsequent testing, and then perhaps he might show a pathologic change at a still later testing. This seemed to suggest that the greater number of pathologic changes in the improved group might be related to an absence of what might

TABLE III

Per cent of Improved Group vs. Per cent of Unimproved Group Showing Pathologic Changes on Specific Rorschach Factors

Factor	% Imp.	% Unimp.	$\sigma D\%$	*t*	P
Refusal	43	17	20.10	1.30	>.10
W	36	33	23.12	.10	>.10
Dd	57	17	20.11	2.01	.06
S	21	00	10.94	1.95	.07
P	64	17	19.83	2.40	.03
At, Sex	21	17	18.68	.25	>.10
Range	71	00	12.08	5.91	.01
F+%	50	67	23.39	.71	>.10
Contamination	71	50	23.73	.90	>.10
FV, Fc	57	33	23.37	1.02	>.10
c	36	17	19.83	.96	>.10
C′	21	33	22.15	.54	>.10
Y (K, k)	21	33	22.15	.54	>.10
M	29	17	19.37	.61	>.10
FM, FM:M	21	00	10.94	1.96	.07
m	21	00	10.94	1.96	.07
Total M	50	17	20.18	1.65	>.10
FC	43	33	23.37	.41	>.10
CF, CF:FC	14	33	21.42	.88	>.10
C, Cn	43	17	20.10	1.30	>.10
Total C	36	50	24.10	.59	>.10
C:M	36	17	19.83	.96	>.10

be called "personality rigidity." In order to test this, the number of fluctuations from one testing to the next was studied. For the purpose of this study, a fluctuation was a change from one testing to the next which was in a direction opposite to the change from the previous Rorschach. For example, a subject who gave more refusals on his second testing than his first would receive a score of 1 fluctuation. If on the third testing, he gave less refusals than on the second, he received a score of 2 fluctuations. If on the fourth testing, he continued to give even fewer refusals than on the third, he still received a score of 2 fluctuations, since the direction of refusals from the third to the fourth testing was the same as the direction from the second to the third testing.

In treating the fluctuations statistically, a comparison was again made between the improved and unimproved groups. The number of fluctuations for each patient on all the Rorschach factors was determined, the mean fluctuation for each group was calculated and a *t*-test of significance was applied to the data. The mean fluctuation for the improved group was 49.4 as compared to 34.5 for the unimproved group. (Table IV.) This difference is significant at the 3 per cent level.

The data were further analyzed to determine which specific Rorschach factors showed significant differences in fluctuation between the two groups. The number of fluctuations

TABLE IV

Difference in Mean Fluctuations Between Improved and Unimproved Groups

	M	σDM	t	P
Improved	49.4	6.2	2.40	.03
Unimproved	34.5			

TABLE V

Mean Fluctuations of Improved Group vs. Unimproved Group on Specific Rorschach Factors

Factor	Mean Improved	Mean Unimproved	σDM	t	P
Refusal	1.64	.83	.70	1.15	>.10
W	2.21	2.17	.92	.04	>.10
Dd	1.93	2.17	1.11	.68	>.10
S	1.36	.50	.79	1.09	>.10
P	2.57	2.17	.74	.54	>.10
At, Sex	.71	.50	.85	.25	>.10
Range	2.64	2.17	1.71	.28	>.10
F+%	2.79	2.33	1.59	.29	>.10
Contamination	1.79	.83	.68	1.41	>.10
FV, Fc	2.43	1.83	1.72	.35	>.10
c	1.79	.17	.78	2.08	.05
C′	.43	.67	1.85	.13	>.10
Y (K, k)	.79	1.33	1.27	.43	>.10
M	1.50	1.50	.90	.00	>.10
FM, FM:M	1.50	.83	.68	.99	>.10
m	.71	.00	.34	2.09	.05
Total M	2.50	1.67	.82	1.01	>.10
FC	1.86	1.50	.78	.46	>.10
CF, CF:FC	1.86	2.67	.86	.94	>.10
C, Cn	2.21	1.00	.55	2.20	.05
Total C	2.14	2.00	.75	.19	>.10
C:M	3.07	2.17	1.05	.86	>.10

for a given Rorschach factor was determined for each patient, the mean number of fluctuations in each Rorschach factor for both groups was calculated, and the differences between the means were tested. (Table V.)

The results of this analysis showed three factors to be significant at the 5 per cent level. The significant factors were pure color, inanimate movement, and undifferentiated shading. Most of the nonsignificant factors showed a trend toward more fluctuations in the improved group.

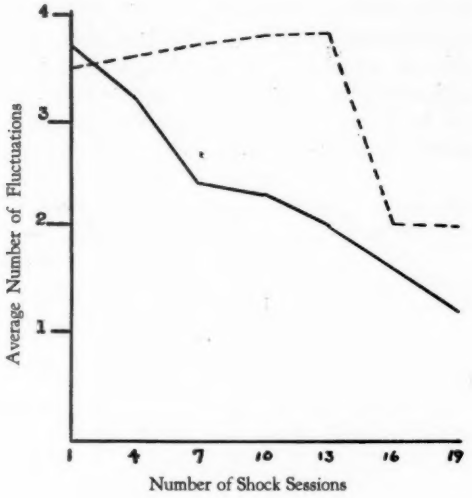

FIGURE 1. Mean number of fluctuations of Improved and Unimproved Groups.

Improved: - - - - - - - - - - -

Unimproved: ———————

As a final analysis, the improved and unimproved groups were studied in terms of their fluctuations on all factors from one shock period to the next throughout the entire series of shock treatments. This was done in order to study the differences in the quantity of fluctuation from one shock period to the next, so as to determine whether the pattern of fluctuations for each group was distinct.

Figure 1 represents the average number of fluctuations in all Rorschach factors for the 2 patient groups for each week of shock treatment, and it indicates that there is a marked difference between the pattern of fluctuations for each group. The unimproved group shows a continuous reduction in the number of fluctuations in its Rorschach records, i.e., the greatest number of changes in Rorschach factors for the unimproved group occurs after the first shock treatment, and after this there is a consistent trend toward fewer and fewer fluctuations. The improved group, however, shows a slight but consistent increase in the number of fluctuations until more than half of the shock treatments have been administered (approximately the 13th treatment). Following this, there is a fairly sharp reduction of fluctuations, but even after the nineteenth treatment, the number of fluctuations for the improved is greater than that for the unimproved group, with the latter still showing a decline.

DISCUSSION

In order for the preceding findings to support the hypotheses, it would need to be shown that the preshock Rorschachs of the improved and unimproved groups were not significantly different insofar as the degree of pathology is concerned. If the unimproved group had a

greater degree of Rorschach pathology preshock than the improved group, then the former clearly would have less opportunity to show more pathologic changes. In order to assess this, the preshock Rorschachs of each group were compared for the degree of Rorschach pathology by utilizing Munroe's scoring scheme. There was no significant difference between the mean scores of both groups, thus indicating no preshock differences between the 2 groups insofar as the degree of Rorschach pathology was concerned. (Table VI.)

TABLE VI

Difference in Mean Munroe Scores of Preshock Rorschachs Between Improved and Unimproved Groups

	M	σ_{DM}	t	P
Improved	16.1	2.88	.35	>.10
Unimproved	17.3			

The results of the study indicate that the patients rated as psychiatrically improved had more pathologic changes in their Rorschachs during the course of shock treatment than did the unimproved. This would support the hypothesis of this study that greater pathologic change during shock treatment is associated with improvement. In this context, it is of interest to note the clinical observations made by Freeman and Watts[3] and Lowenbach and Stainbrook[10] who state that frequent convulsions and the consequent development of long standing disorientation are prerequisites for successful results in shock therapy.

The improved patients also showed greater fluctuation in their Rorschachs during shock therapy, while the unimproved showed significantly less fluctuation. This would support the proposition that the absence of "personality rigidity" is related to psychiatric improvement. The interesting observation by Boss reported by Stainbrook[20] which further supports this finding is that patients showing no change in dream content while being treated by convulsive therapy are likely to have a poor prognosis.

The present study has within it an important limitation that should be considered in evaluating the results. Obviously the sample is too small to permit any gross generalizations. With only 6 subjects in one of the groups, it may be presumed that the reliability of the findings is likely to be lowered. Any extension of this research effort should be designed with larger samples than were possible in the present study. However, it should be stressed that the statistical criteria used to demonstrate differences between the 2 groups were dictated by the size of the sample—the smaller the sample, the more severe the statistical test of significance. The results reported here do meet these severe tests of statistical significance.

The present study demonstrates the need to evaluate carefully the changes occurring during the entire course of shock treatment in order to fully understand its therapeutic effect. A significant approach to this problem would combine the methodology of Stainbrook,[21] Janis,[5] and the present research by studying a series of subjects for the immediate effects of electroshock treatments after each convulsion, the changes occurring throughout the course of shock treatment, and results achieved after the completion of treatments.

SUMMARY

The purpose of this study was to evaluate the personality changes of mentally ill patients as revealed by the Rorschach test throughout complete courses of electroshock therapy. It was hypothesized that in effective shock treatment there are greater pathologic changes in personality during the course of the treatment, and that therefore the Rorschach records of patients who improved after therapy would show more pathologic changes during treatment than those of unimproved patients. The results of the study lend support to this hypothesis. The study also supports the thesis that these findings are related to the absence of "personality rigidity" in the improved patients.

1. The psychiatric rating scale comprised the following:

a. Recovered or Symptom-Free

This term is applied to patients who are free from subjective symptoms, who demonstrate social recovery by living at home under normal conditions, and who are able to return to their former level of useful employment. In most instances families are unable to describe any unfavorable change from their premorbid personalities and adjustments, even though deviations from normal might still be apparent to the psychiatrist.

b. Markedly Improved

Those patients whose subjective and objective symptoms have almost but not entirely disappeared, who manifest good environmental adjustment at home or in the hospital, and who are capable of work, though not necessarily up to their former standards.

c. Moderately Improved

Patients who show appreciable diminution in symptoms, who constitute little or no problem in care, and exhibit definite improvement in either environmental or work adjustment or both. In this category are patients who previously had been serious nursing problems and are now able to take part in occupational and recreational therapy or do simple work in the hospital.

d. Slightly Improved

No indication of change in environmental or work adjustment and only slight improvement in symptoms; the problems of management may be reduced somewhat but the patients may require careful supervision. Such patients have often lost troublesome features of their illness such as violent, assaultive, or destructive tendencies, food refusal, or suicidal attempts.

e. Unimproved

The patients who do not manifest any change.

f. Worse

Those patients who show exacerbation of previous intractable behavior or increase in subjective symptoms.

RESUMEN

El propósito de este trabajo consiste en evaluar los cambios en la personalidad de los pacientes mentales, como lo reveló la prueba de Rorschach a lo largo de series completas de terapia por electrochoque. Se ha sentado la hipótesis de que en una terapia eficaz por el electrochoque, hay mayores cambios patológicos en la personalidad durante el curso del tratamiento y que, por lo tanto, los datos suministrados por las pruebas de Rorschach en pacientes que mejoraron después de la terapia, mostrarían más cambios patológicos durante el tratamiento, que los de los pacientes que no mejoraron. Los resultados del estudio favorecen esta hipótesis. El estudio también sostiene la tesis de que estos hallazgos están relacionados en los pacientes mejorados con la ausencia de "rigidez de la personalidad."

RESUME

Le but de ce travail consiste à évaluer les changements dans la personnalité des malades mentaux, tel que le révèle l'épreuve de Rorschach durant des séries complètes de thérapie par l'électrochoque. On soutient l'hypothèse que dans la thérapie efficace par l'électrochoque, il y a plus de changements pathologiques dans la personnalité durant le cours du traitement et que, par conséquent, le dossier Rorschach des malades qui s'améliorent durant la thérapie, montrerait plus de changements pathologiques pendant le traitement que ceux des malades qui ne s'améliorent pas. Les résultats de cette étude favoriseraient cette hypothèse. L'étude soutient aussi la thèse que ces résultats sont relatifs à l'absence de "rigidité de la personnalité" chez les malades améliorés.

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Testing Patterns in Acromegaly*

Harold Geist, Ph.D.
Ralph Crawshaw, M.D.

MARE ISLAND, CALIF.

INTRODUCTION

The physical and purely medical aspects of acromegaly have been systematically explored for a long time, but the subject of mental disturbance associated with this pituitary disorder is a relatively new field, primarily because such a study is in the realm of subjective interpretation. The whole area has been succinctly summarized by Menninger.[1] However, since the field of psychiatry embraces what Menninger calls "a general and total view of all the symptoms of the sick man,"[1] this new area cannot be neglected in studying diseases which have psychiatric or adjustment implications. Acromegaly is such a disease, and a case study is presented which attempts the experimental method, with as many objective tools as possible used to explore the facets of personality structure that are parts of the total clinical picture of this abnormality.

HISTORY OF ACROMEGALY

Acromegaly was probably first noticed in the thirteenth century. On the Reims Cathedral there is a figure of a woman with large hands, prominent nose and chin, and broad shoulders, quite typical of victims of this complaint, and the attitude suggests she is suffering from violent pains of the head. The oldest historical document on acromegaly known is a portrait of a "giant of the Court of the Elector of the Palatinate, Frederick II," preserved in the Ambross Schloss in the Tyrol, painted life-size in 1553 by the court painter. The oldest medical account is the case of "Sieur Mirbeck" described as "*accroissement considerable des os dans une personne adulte.*" Alibert, the great dermatologist, described another case in 1822 of the disease under the name "giant scrofileux." Magendie describes 2 cases in his lectures (edited as a book in 1839) on the physiology of the nervous system. The condition was then described as "hypertrophy of doubtful, possibly of nervous, origin." Friedreich in 1868, described two brothers, Wilhelm and Carl Hagner, who had a "general hyperostosis." Others such as Verga, Faruffi, and Lombroso in Italy described various aspects of the disease. In 1886 Pierre Marie of Charcot's Clinic published an article under the title "*Sur deux cas d' acromegalie, hypertrophie singuliere non congenitale des extremites superieures, inferieures et cephalique.*" In the sketch of the "new" disease, Marie originally intended to name the disease "akromakrie" (ἄκρον = end meyas = large), but chose before publication acromegaly, for the sake of euphony.

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*The opinions expressed herein are those of the writers and do not reflect those of the United States Naval Service.

Up to Marie's time, cases of acromegaly had been published under varied designations, and now it was necessary to separate these from true acromegaly, and based on the new knowledge to define the disease more accurately. In 1888 Marie gave a copious grouping of the disease; then in a precise and in a more detailed work in English, he presented a new description of the disease. Thus, Marie was the first to bring acromegaly out of the catalogue of the rare and monstrous into the domain of clinical medicine. His was the first attempt to define the type of affliction and to make a differential diagnosis possible.

In 1870 Souza-Leite, a pupil of Marie's, presented in a monograph a representation of acromegaly which also contained the collected cases in detail. From then on the literature was flooded on the subject. The majority of investigations, however, have studied alterations in a single organic system, e.g., the organ of sight (Schultze, Asmus, Hertel, Dente, Uhthoff), cardiac disturbances (Fournier), atrophy of muscles (Duchesnau). New light has been thrown on the subject by Pel and Unverricht's suggestion of mental and bodily trauma.

MEDICAL AND PSYCHIATRIC ASPECTS

The purely medical aspects of acromegaly are well-known. The gross and microscopic pathology, the diagnosis, and differential diagnosis have also been systematically studied by various investigators. The histopathological changes seem to take place in the pars distalis of the hypophysis cerebri, consisting of an adenomatous formation of alpha cells. The normal acinous structure tends to be lost, the cells lie in a loose mass, practically without stroma. The cells contain alpha granules and are finer than the normal alpha granules which tend to collect in the periphery of the cytoplasm. Other aspects are summarized by Davidoff[2] who studied 100 patients at the Peter Bent Brigham Hospital during the years 1913–1926. Davidoff, in this study also lists the sociologic data, such as sex, race, fecundity of the patients (Tables I and II).

The psychiatric aspects, however, have only been examined sporadically. Büchler[3] reports 2 cases of acromegaly that show symptoms of schizophrenia, one a catatonic with paranoid dementia, and the other a hebephrenic. Davis[4] reports a case of a 28 year old acromegalic man who had the symptoms of a severe psychoneurosis which developed only after the disease had reached the disfiguring stage. The patient resisted treatment; the resistance seemed based on the threatened permanence of the cause of the distress, the so-called acromegalic face. This case is discussed in detail. The patient's developmental history shows a considerable degree of initial normality, but after developing the disease, he was unable to meet strangers or old friends; several times he cried or broke down in public, because there he felt his thick lips and unshapen jaw were causes of unfriendly comment. He showed deep emotion when telling anyone his troubles and could initiate no plans because his mind was lost in thinking of his affliction; he no longer had ambition or confidence in himself.

Davis[4] theorizes that these defects cause development of both psychoneurosis and dementia praecox. He has stated:

"That such a factor as the endocrinal defect should be common to two such conditions as psychoneurosis and dementia praecox rests on the fact that in dementia praecox it is ex-

TABLE I

STUDIES IN ACROMEGALY

THE ANAMNESIS AND SYMPTOMATOLOGY IN ONE HUNDRED CASES

Leo M. Davidoff

Symptoms and Signs of Acromegaly as Recorded in Clinical Histories

Symptoms	*Incidence*
Enlargement of acral parts	100%
Enlargement of sella turcia on x-ray examination	93%
Disturbance of menstrual cycle	87%*
Headaches	87%
Complete amenorrhea	73%†
Increased basal metabolic rate	70%**
Visual disturbances	62%
Excessive perspiration	60%
Hypertrichosis	53%
Cutaneous pigmentation	46%
Drowsiness and lethargy	42%
Gain in weight	39%
Diminished libido sexualis	38%
Asthenia	33%
Low blood pressure (less than 120 mm. Hg. systolic)	30%
Paresthesia	30%
Polyphagia	28%
Fibromata mollusca of skin	27%
Polydipsia	25%
Enlarged thyroid gland	25%
Glycosuria (diabetes mellitus 12)	25%
Constipation	20%
Vomiting	16%
Rhinorrhea	15%
Photophobia	12%
Uncinate attacks	7%
Failing memory	7%
Decrease of body hair	7%
Persistent lactation	4%
Failure of breasts to develop	4%
Epistaxis	3%
Choked discs	3%

*Percentage of female patients.
†Percentage of female patients.
**Percentage of 70 cases examined.

ceedingly early and prodromal. In each, other factors enter—in the praecox to complete the estranging and withdrawal, and in the psychoneurosis to produce a combative attitude. In fact, one might distinguish them in terms of fleeing and fighting. While up to a certain point the praecox and psychoneurotic patients face similar difficulties and receive similar

TABLE II

An analysis of 100 consecutive cases of acromegaly observed at the Peter Bent Brigham Hospital during the years 1913–1926 has been undertaken, chiefly from the standpoint of the anamnesis.

Only two out of every 1,000 patients admitted to the hospital, and approximately one in every five with a diagnosis of pituitary disorder, presented this condition.

All the patients belonged to the Caucasian race. Twenty-one per cent were Jewish.

The relative incidence between sexes is probably about equal.

The disease begins most commonly between the ages of 18 and 35 years.

Certainly hereditary influences exist as shown by the fact that a family history of acromegaly in 4% of the cases, and in 20% a family history of noticeably large individuals, was recorded.

The fecundity of the patients was below the usual average, and the number of children born to those who married after the onset of the symptoms was small.

The anamnesis revealed no unusual susceptibility to any group of diseases or to any particular type of accidents. In the women, the catamenia became established at an average age of 14 years, and cessation of menstruations occurred at an average age of only 31.3 years.

A very large number of symptoms were recorded, pointing to the far-reaching effects of this disease. The more important of these symptoms have been especially considered in their relationship to the seat of the underlying pathological changes.

From all this it would seem that the part played by the pars anterior of the hypophysis is undeniably one of primary importance. Its exact role is not yet entirely clear, but the hypertrophic changes so characteristic of the disease, occurring as they do in people at least half of whom have reached a maximal or even excessive stature before the apparent onset of the malady, are thought to signify a pathological hyperfunction of this gland which not only initiates the process but continues, perhaps with varying intensity, throughout the course of the illness.

Usually the overactivity of the gland is followed by a tumor formation giving rise to pressure symptoms such as headache, bitemporal hemianopsia, and primary optic atrophy.

Finally other symptoms develop, which are obviously of a secondary nature. They are associated with a general splanchnomegaly with a profound disturbance of the reproductive glands, and with evidence of secondary involvement of other of the endocrine organs.

ill effects, the former flees the situation and retreats into a psychosis, while the latter fights ever so wildly."

While the assumptions drawn by Davis are debatable, it is interesting to note that such hypotheses are not entirely within the realm of pure speculation. Barker[8] in discussing the mental condition of acromegaly states that there are marked mental disturbances, most frequently of a hypomanic character (tendency to push talking, acceleration of movements

and thoughts, egocentricity, etc.). He believes that when psychoses of the manic depressive type appear, they are dependent upon constitutional anomalies other than the endocrine disturbances.

Probably the most accurate account of the psychopathologic symptomatology of acromegaly is the remarkable autobiographic account of the disease by Mark,[6] who describes in great detail his own affliction, which he did not recognize until it was well advanced. Although the physical symptoms cannot be completely separated from the mental, there appears to be a complete set which are almost hallucinatory in character. For example, in connection with faceache, Mark states:

1. Left side of my face being squeezed in a vise.
2. Left antrum of Highmore is tightly packed with some substance like cotton wool.
3. Left eye is being pressed upon or pushed back into the socket.
4. Left side of head has gone to sleep.
5. Stream of cold water playing upon my face.
6. That a huge crab is clawing hold of me on that side.

He continues:

"First there is a continual seething sound, very slight in degree, like that of a kettle boiling, or the fermentation of yeast. The greatest characteristic is its persistency. It never ceases while I am awake, and I am aware that it is going on even if I wake up in the middle of my night's sleep. It has become a part of my normal condition. It never varies in its note and is quite unaffected by any posture I may be in, by the absorption of any food or drink, by fatigue or rest.

"Secondly, a louder noise or a medley of sounds, all of a fizzling character, reminding me of a Seidlitz powder, or the foaming of waves on the seashore when the tide is in. Several different notes can be detected with frequent variations, seeming to come from all directions. I am more subject to it in winter and early spring, when my nasal catarrh is most troublesome. It may then come two or three times in the same day, or several times in one week.

"Thirdly, sometimes I notice a most peculiar, sharp, shrill noise in my head which I might compare to the buzzing of a small gnat. Its role is very highly pitched and always seems to be the same. It lasts from fifteen to thirty seconds."

In speaking of society's reaction to his deformity, he states:

"On some occasions I may be walking in the street, or in places where people congregate, when the fit is on, making me feel sick and look more acromegalic. And then should a group of young women pass by, and should they be that age when maids are wont to giggle, I become aware that their brains contain a centre capable of being stimulated by something in my appearance."

Mark[6] summarizes the mental state:

"The acromegalic state is a physical one. But it does, to a certain extent, affect one's mental capacities which become depressed by the helplessness and the desire to avoid any effort, mental or physical. One has not that alacrity of spirit one wants to have. . . .

"But even when the state is very bad, one can master it by any very intense desire or emotion. With an effort one can pull oneself together. But a corresponding state of collapse

follows with an extra feeling of weakness."

The question of whether the emotional maladjustment is due to the actual disorder itself or to the patient's reaction to the way society views him is a moot question.

Menninger[1] states: "While the mental reaction type varies even with the same type of pituitary disorder, the association in some cases is so close that I regard the mental symptoms as probably the direct result of a disturbance in the secretory activity of the pituitary gland, exclusive, of course, of cases of tumor, in which the mental symptoms might result from pressure on the frontal lobes." He also states: ". . . such inferiority feelings are noticeable in a large percentage of cases of dispituitarism, occurring in persons superior, or even above the average intelligence."

In the same article Bassol[1] states:

"In the milder forms, a condition exists which is very similar to what we discussed last year in Washington in connection with leprosy. To imagine oneself a pronounced leper, having to be segregated, ought to be enough to explain moderate degrees of depression. The same is true of acromegaly, especially in women. Being stared at would be sufficient to account for moderate degrees of sensitiveness and depression. When it comes to the real psychosis, there is no question about the manic-depressive type being the predominating one. When it comes to determining the cause of these psychoses, we are confronted with many factors."

The problem of whether the personality changes in the acromegalic are due to the disease itself, or the patient's reaction to a hostile society, may be argued *ad infinitum*. It appears that these changes are a combination of the two, but whatever the reasons, there is still a definite pattern which the authors have attempted to examine by objective psychologic tests. The following case is one which is illustrative of many such cases.

BACKGROUND MATERIAL

The patient was born and brought up in the Northwest. His father, a member of the Highway Department, was a foreman in charge of road gangs. As a child the patient led a nomadic life traveling with his father, mother, and older sister to construction jobs. The traveling did not seem to have been traumatic to the patient for he found a rather secure family constellation in which to grow up. He has many fond memories of spending the summer camping. Much time was spent by the patient in delightful fantasy, recounting the early years of his life, camping out along the banks of the Columbia River. He states that his parents got along well, that there was an easy interplay of emotion among the members of the family, and that discipline was present but never harsh. The patient was an average student in school, and when his father was finally placed in charge of a section of the highway so that they could settle in one town, he made an adequate adjustment to his classmates in school. The patient met his wife a short while after he left high school. He had known his wife a relatively short time, and had met her infrequently, when she visited him and they were married suddenly. The patient is not explicit in describing the precipitant nature of their attachment, but he indicated in looking back that he thinks she

was anxious to become a war widow. The patient left for overseas Army duty, and it was not until a year and a half later that he again saw his wife. He went to school on the east coast but his wife refused to live there because of the climate. The patient, as a consequence, did not see his wife for a period of nine months. He wrote her frequently, and she always wrote that she was well and did not really want to see him right then but would see him shortly. He became impatient over their separation and impulsively decided to visit her. He went to the address she had given him but did not find her there, however, he managed to locate her in a small town out of the city. When he walked in he found an infant in the house with her. The patient was surprised, and doubly surprised when he was told by her that he was the father of the infant. He accepted this explanation without question. The patient was interested in leaving the Army because his wife would not live at his duty station, but she insisted that he remain in the Service. This meant numerous separations and a few long periods together. The patient's illness was progressive and became noticeable to all about this time. There were many bitter arguments that grew out of the interpersonal relations of the three members of the family. (At this time the patient's mother-in-law was living in their home.) They generally disagreed over the way the child should be reared. The patient reacted to stress by withholding all expression of his own emotions and accepting the dictates of his mother-in-law through his wife. He felt that his mother-in-law was anxious to separate and break up the family because she had been unable to remain married herself. The patient reiterated numerous occasions on which his wife was indoctrinated by his mother-in-law into the belief that all men were evil, and the patient, in particular, was an unacceptable individual. On a few occasions near the latter part of their relationship, the patient became mildly intoxicated and gave in to his feelings, expressing himself verbally, though on one occasion he struck his wife. His wife left the home with their child and began proceedings for divorce. It was at this point, after a prolonged period of hospitalization for his endocrine difficulties, that the patient was seen in psychotherapy. He was referred by the medical department because of restlessness, anxiety, confusion, and depression.

FIRST SESSION

The patient readily discussed his emotions and while doing so cried easily. He was agitated and depressed. He smoked excessively, his hands moved back and forth over his knees, he hunched forward, and at times ran his fingers through his hair. He berated his wife for her irrational behavior, her inability to understand him, and he dwelt upon his severe family problems. In particular he vented much hostility about his mother-in-law, and stated that he felt many of the emotional problems his child had, particularly with regard to eating, stemmed from her inconsistent attitude at meal times. He was upset about his child because his wife had suddenly threatened to rear the child in another religious faith. This seemed to him unreasonable as there had been no previous talk of it, and no known reason for the change. The patient felt that he was a helpless individual in the situation, that he was unable to handle his problems, and was being overwhelmed by the pressure.

SECOND SESSION

He came voluntarily at an unscheduled hour, stating he had a question to ask. This session lasted 15 minutes, during which he wondered if he should visit his son who was at present staying with his estranged wife. This was interpreted to be a question of whether the patient was acceptable to the therapist and people in general, because he mentioned for the first time his severe endocrine difficulty, and wondered if it were harmful to people for them to see him in his present state.

THIRD SESSION

He immediately began discussing his endocrine difficulty and mentioned that he was less depressed and was observed to talk in a more relieved, freer manner. He spoke of his first learning about his illness in 1944, stating that it was not a shock to him, but gradually, as time passed, he realized that he was a medical curiosity, and by 1947 began to feel his present strain. His illness was continually pointed out to him by every new physician, and on one occasion he was told by a psychiatrist he was spending too much time thinking about himself. He then discussed his early relationship with his wife, and clarified, in an easy manner, his relationship with her. He spoke of confusion that he had been having, and closed the hour explaining the magnitude of his problems.

FOURTH SESSION

The patient was again seen for 45 minutes, and again brought up the problem of possible injury to his son if he were to visit him. He decided it would probably help more than injure. From here the emphasis was changed to whether or not the patient would be injured during the visits. He explained that during his visits with his estranged wife he felt a tremendous amount of hostility at her rejection of any attempts on his part to talk about reconciliation. He had left the first visit in a fit of rage and helpless fury. The second visit he left with a feeling of resignation. He then expressed much hostility about his wife, and among other things, stated that she had been trying to leave him ever since she had the baby —after the unannounced pregnancy.

FIFTH SESSION

The patient had been to his parental home and returned somewhat relieved with many detailed plans for his future. He appeared much more at ease, and his plans proved to be quite realistic with regard to his occupation in the future. He stated that he would not worry about his son any longer, that he was resigned to having his son just for the summers.

SIXTH SESSION

The patient was seen for 45 minutes, during which time he outlined a plan of action concerning his relationship with his child. He had met his wife and son again, and outwardly he showed no emotional disturbance by the meeting. The patient revealed that he had

decided to take the child into his own custody, and instigate divorce proceedings from another state. It proved the patient had done intensive investigation concerning his plans during the previous month and only now felt free to uncover his plan. His mind was made up, and though he used many rationalizations about his wife's bad behavior, etc., he did state that he felt an emotional need to have this child close to him. The patient stated that he had one period of depression, and while he discussed it he became depressed. However, he generally felt better, and seemed freer in discussing his plans. His anxiety had subsided. He was not confused and presented a well integrated personality to superficial observation. There was evidence of unresolved anxiety in his closing statement that he was "an Indian and may never settle down."

CLINICAL SUMMARY

Date admitted to sick list: October 23, 1951.

Diagnosis: Acromegaly, Hypertensive Vascular Disease.

Medical History: This 34 year old man was admitted to the sick list with the diagnosis acromegaly. Chief complaints at time of admission were inability to concentrate and progressive mental confusion. History revealed that the first noticeable change in his physical appearance was slight enlargement of the jaw eight years previously. To the best of his knowledge, the diagnosis of acromegaly was first established five years ago. Between 1944 and 1947 enlargement of the skull, facial bones, hands, and feet were progressive. Collar size changed from 16½ inches to 18 inches. He was readmitted to the hospital three years ago with the same diagnosis. The third admission for the present condition was effected in 1950 for routine check-up. Growth changes of the acral parts of the body had been progressive since 1947. For the past year, the patient has noticed a gradual increase in his inability to concentrate. There has been intermittent mental confusion. For the past three or four months he has had almost constant, moderately severe bitemporal headache. There has been mild to moderate exertional dyspnea for six or eight months.

Present Complaints: Occasional bitemporal headache and inability to concentrate.

Laboratory Examinations: Hemogram and urinalysis normal. Sedimentation rate 2 millimeters per hour. Blood Kahn, negative. Blood chemistry: non-protein nitrogen—23 mg.; glucose—75 mg.; calcium—13 mg.; phosphorus—5.4 mg. X-ray studies of the skull, hands and feet showed changes consistent with acromegaly. X-ray of the chest showed the lungs to be clear; the left ventricle was prominent. Electrocardiogram within normal limits. Basal metabolic rate: plus 29. Further urine examinations and study of the renal output were within normal limits.

PH: Mumps, measles, chicken-pox, pertussis in childhood. Operation for pilonidal cyst in 1940. Operations for removal of nasal polyps in 1942 and 1945. No serious injuries.

FH: Father living and well. Mother died of Cancer, site unknown, at age 53. Three sisters, one brother, living and well. One sister died in childbirth. One brother died three days after birth.

PE:	The patient is a 34 year old white man, well nourished; he does not appear acutely ill.
HEAD:	Typical acromegalic appearance (enlarged and prominent frontal bones, enlargement of mandible and maxilla, prominent ears and nose, thickness of lips).
EYES:	Pupils are round, equal, react normally to light and accommodation. No nystagmus or strabismus.
ENT:	Ears show no evidence of external infection, canals and drums normal. Nose normal.
THROAT:	Tongue appears enlarged and thickened. Extensive dental repair. Pharynx appears normal.
NECK:	No adenopathy or rigidity. Thyroid not enlarged.
THORAX:	Symmetrical. Respiratory excursions equal and slightly diminished on deep inspiration. Percussion note normally resonant. Breath sounds are visicular. A few moist râles are heard at the left base, posteriorly. Heart slightly enlarged to the left. There is reduplication of the first sounds over the precordium, closely resembling a gallop rhythm over the aortic area. No murmurs are heard. Blood Pressure: Left arm—200/120; Right arm—205/120.
ABDOMEN:	No organs or masses palpable. Tenderness over left upper quadrant. No scars. No hernia.
G-U:	Normal male.
EXTREMITIES:	Marked enlargement of hands and feet. No peripheral edema.
REFLEXES:	Normal active.
SKIN:	Intertriginous type erythema folds of both axillae.
RECTAL:	There are several external hemorrhoids.
X-RAY REPORT:	The bones of the hands and feet are large and broad. No other significant bone or joint abnormality is noted. Their appearance is consistent with acromegaly. Skull: the turcica is quite enlarged on both the vertical and horizontal dimensions. The sella has a double floor and there is marked thinning of the posterior clinoids. The calvarium is thickened and the paranasal sinuses are much larger than average. There are all features of acromegaly. The pinial is calcified and lies in normal position. Chest: the lungs are clear. The left ventricle is prominent, however the overall transverse diameter is at the upper limits of normal.

Impression: Intrase'lar tumor with acromegaly.

TESTING MATERIAL

The patient was referred to the clinical psychologist by the psychiatrist for the purpose of personality evaluation because of the continued depression and mental difficulties. The

following tests were administered: The Minnesota Multiphasic Personality Inventory; the Wechsler-Bellevue; the Rorschach; the Thematic Apperception Test; the Blacky Projective Test; the Draw A Person Test and the Bender-Gestalt.

TEST ANALYSIS

A. Profile analysis of the MMPI indicates that the profile resembles that of a combination of character disorder and psychoneurotic profiles, according to Gough's[7] empirical profiles. The most outstanding characteristics of the profile are the high psychopathic deviate score, and the marked elevation of the neurotic triad (hypochondriosis, depression and hysteria) as compared with the psychotic triad (psychasthenia, schizophrenia and hypomania).

It is interesting to note that the Lie Score and F (validity scores) are within normal limits. The implication of the profile analysis of the MMPI will be discussed in the total personality evaluation.

B. Wechsler-Bellevue. The patient's I.Q., slightly above average, shows interesting facets in the subtest analysis. The relatively low memory span for digits, associated with what Wechsler[8] calls "lack of mental control" or more precisely, a general difficulty in maintaining attention and the ability to do concentrated work. As might be expected in cases of this type, the symptomatology of severe faceache and headache would interfere with such control. The picture arrangement test is primarily a test of the social intelligence, or more precisely, general intelligence applied to social situations. It is very possible that such a specialized type of intelligence may have been "damaged" by the disfigurement of the acromegaly, while not hurting the more general type of the intelligence as measured by the full test. This is seen to be the case, since the deterioration index is negligible—about 5 per cent. The scatter analysis resembles that of schizophrenia, although the pattern is not a typical one.

C. The Rorschach. A quantitative analysis reveals a rather high m, A%, and C' scores in the determinants. Internal conflict incompatible with inner drives should be expected in such a case. The depression (high C') is borne out in the sequence analysis of the record. The patient was still at this time in good contact with reality (high P).

The gross distortion in the perception of the environment, amounting to almost paranoid proportions, is indicated in the number of frightening faces in the concepts; for example in Card I:

1. W—cat, face of lynx.
2. W—a grotesque mask, perhaps a witch doctor ("somebody had trouble cleaning it up").

Card VI:

1. d—fantastically shaped ink blot, peculiarly shaped faces.
2. D—profile with beard sticking out in wind behind him.

Many of the concepts were seen as cartoons, indicating a certain amount of psychologic impotency. The "spattered blood" (together with the other m and C responses) reveals that there is violent conflict going on within this person, approaching a serious type of psychopathology.

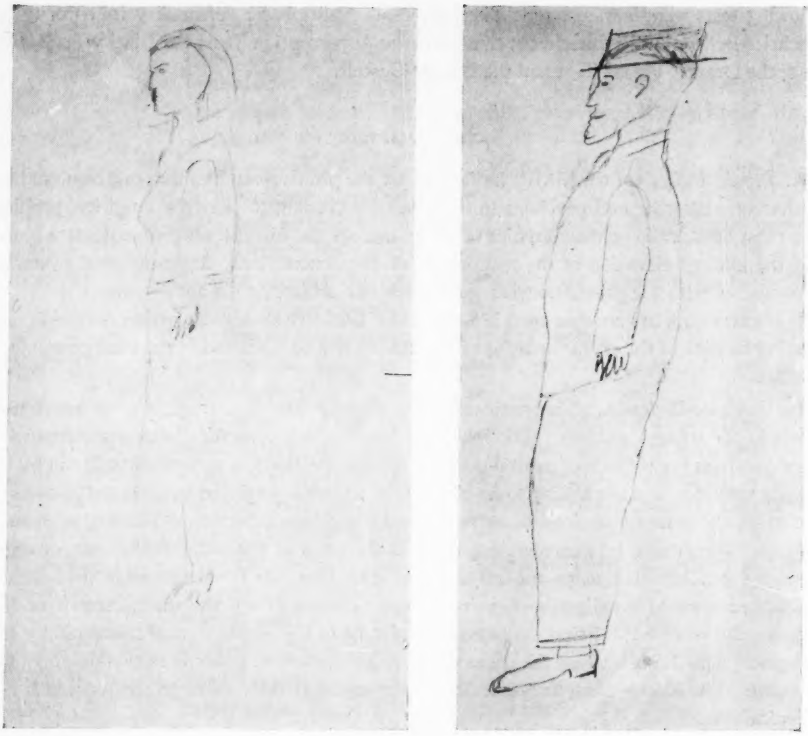

FIGURE 1. (left) The patient's drawing of a dressed female for the Draw A Person Test.
FIGURE 2. (right) The patient's drawing of a dressed male.

D. Thematic Apperception Test. Because of the variety of methods of interpreting the TAT, the authors have chosen to adhere to the qualitative method suggested by Rapaport,[9] and modified by Schneidman,[10] rather than Murray's[11] quantitative evaluation.

The stories are consistent and the prevailing mood is somber. They are short, with the exception of 12F and 17GF. The figures can be clearly identified as that of the patient (heroes) and those in his psychologic "life space," primarily of his wife and mother-in-law. The "strivings" of this patient might be epitomized by story 10 (abstracted in the following paragraph).

"A man and his wife looking over their past married life and congratulating each other on its being happy and successful, as this family is about grown."

There is undoubtedly a tremendous striving to see his family grown, and be freed of both the tortuous doubt of whether his wife's child is really his or not. The attitude of the patient is clearly revealed in picture 4 (abstracted in the following paragraph).

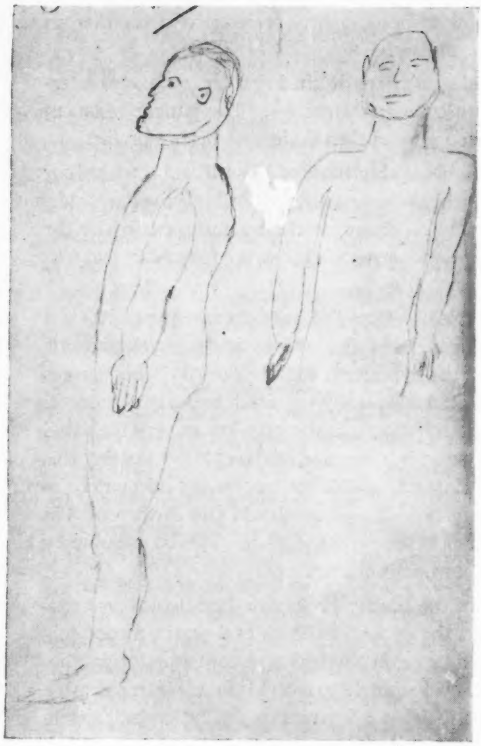

FIGURE 3. (left) Undressed male drawn by the patient.
FIGURE 4. (right) Undressed female drawn by the patient.

"Here is a man torn between the call of duty and the call of love. He knows he has to leave his wife, but does not want to."

The most outstanding characteristic of the TAT stories is the great reduction of ideational activity, and paucity of reproduction, manifest evidence of depression. If a differential diagnosis were to be made on the basis of the TAT stories alone, it would be that of psychoneurosis.

E. Draw A Person Test. The DAP test is the character stereotype of all the figures, indicative of both self-perception and wish fulfillment. Since the percentage of the total population afflicted with acromegaly is small, it is quite significant that all four drawings appear to be either perception of the self (male) or the type of women with whom he wished to associate. The area of conflict, i.e., the acromegalic appearance, is portrayed in the drawings, together with an expression of the type of woman he now desires. In view of the disturbance in the patient's family life, the evidence is revealing, and the assumption can

probably be safely made that the patient now wishes to marry someone who is either an acromegalic, or who has the appearance of the disease.

All the drawings except one (the undressed man) were drawn in profile, quite characteristic of insecure, evasive patients who fear to commit themselves. The patient began to draw the undressed man in front view, but stopped and then decided to draw a profile.

Despite the fact that the drawings were unmistakably those of the self and a wished-for spouse, it is interesting to note that patients who do emphasize the head are the paranoids, narcissistic, intellectually righteous, neurotically depressed; while those who emphasize thr chin (or a jutting chin) are those who compensate for some weakness, are indecisive, and feae responsibility.

F. Bender-Gestalt. Using the scoring criteria of Pascal and Suttel, a raw score of 29 and a Z score of 62 were obtained. This score would put the patient in the psychoneurotic category. Pascal and Suttel[12] have advanced the hypothesis that progressively high scores are correlated with a decreasing ability to respond adequately to stimuli in the environment, or more precisely, that ego strength lies in a continuum from the very low to very high B-G scores (responding adequately to the environment is a function of the ego). Assuming this to be so, this patient has a rather low ego strength, and is not responding adequately to stimuli in his environment. Bender[13] does not believe that we should find disturbances in perception or in the visual motor gestalt function in the psychoneurosis. This is undoubtedly true of this patient, although there is some distortion in the figures.

G. Blacky Projective Test. An analysis of the Blacky Projective Test, which was constructed on psychoanalytic principles, reveals the patient to be an oral erotic, moderately anal sadistic person, who either has regressed or never reached a mature state of psychosexual development. There is evidence of castration anxiety, with his father seen as both a positive ideal and the castrating agent. There is an overpowering feeling of guilt, again with his father seen as the censuring agent. It is revealing to note that in response to Cartoon X (positive ego ideal), the patient responded "dreams that he is grown up." "Going in a world by himself—find own food." The flight from reality fits in with the constellation of symptoms thus far exhibited. In subquestion III of this cartoon he answered, "then he would be very popular with the females," which although a neutral response, is significant in this case. The desire for social approval parallels Mark's observation of a group of females who jibed him because of his deformity. In response to Card XI (love object), the patient's response was "probably dreaming of girl he'll meet some day—like to have her for a companion." The type of girl is probably displayed in his female Draw A Person caricatures.

PERSONALITY EVALUATION

A personality evaluation of this patient reveals him to be an oral erotic, anal sadistic person, who has either regressed, or never reached a more mature psychosexual development, more probably the former. His hostility, originally undirected, is now being vented on his wife and members of her family. His guilt over the family troubles and his appearance

is overpowering, resulting in conflicts incompatible with his normal drives. It is significant that he perceives his father as a censuring agent for events over which he has no control. It is also significant that no over-all intellectual retardation has as yet set in, but there is a disturbance of some of the more specialized types of intelligence. Although the disease is of organic origin, the constellation of personality, it seems, does not fit the usual organic pattern.

It is in the area of perception of the environment that the patient exhibits the greatest deviations. He is extremely frightened, depressed, feels helpless before it, and at times retreats into the fantasy production to compensate for the overpowering fear of the "grotesque masks" and "peculiarly shaped" faces that are constantly leering at him. The escape takes further form in wish fulfillment for a friend and wife afflicted with the same disorder. There is strong evidence for needs of affection, comfort and security.

The authors are disinclined to agree with Davis, who believes that this disease shows the psychiatric syndromes of both psychoneurosis and schizophrenia. If a label were to be put on this patient it might be psychoneurosis with some schizophrenic elements.

The implications of an objective analysis of the personality pattern of the acromegalic are significant only when viewed in the light of the responsibility of society in general, and the psychologic and psychiatric professions in particular, in recognizing the difficulties which such people have in adjusting to a life which to them is new and frightening. Although this disease is not as common as, for example, cerebral palsy, nor are the handicaps as great, insofar as mental and physical work output, the unfavorable reaction of society is far greater than that of the more usual crippling and disfiguring afflictions. Since, as of this date, no physical therapy has been discovered to combat the tumor, the psychiatric and psychologic elements become so much more important. It appears that further research is needed in the areas of work and social adjustment.

RESUMEN

Se presentó un caso de acromegalia que fué sometido a un cuidadoso examen diagnóstico y se hizo una evaluación de la personalidad por medio de una serie de pruebas psicológicas. Los cambios de personalidad en el acromegálico, presentan un cuadro característico y son una combinación de los resultados de la enfermedad y de la reacción del paciente ante una sociedad hostil.

De los resultados de estas pruebas, se deduce que las máximas desviaciones sobrevienen del medio ambiente y se debiera hacer un diagnóstico psiquiátrico de este paciente, que sería psiconeurosis con algunos elementos esquizofrénicos.

Las repercusiones de un análisis objetivo del cuadro de la personalidad del acromegálico, son significantes desde el punto de vista de la responsabilidad de la Sociedad en general y de las profesiones psiquiátrica y psicológica en particular, al reconocer las dificultades que tales individuos tienen para adaptarse a una vida que les resulta a la vez nueva y aterradora.

RESUME

On a fait un examen médical minutieux d'un cas d'acromégalie et la personnalité a été évaluée par un groupe de tests psychologiques. Les changements de personnalité chez un sujet acromégalique, qui se révèlent selon un plan caractéristique défini, combinent le résultat de la maladie même, et la réaction du malade envers une société hostile. D'après les résultats de ces tests, le malade montre les plus grandes déviations dans la zone de la perception de l'environnement. S'il fallait faire une classification de ce malade ce serait de psychonévrose avec des éléments schizophrènes.

L'analyse objective du cadre de personnalité de l'acromégalique prend sa vraie signification, vue la responsabilité de la société en général, et celle du psychologue et du psychiatre en particulier, de se rendre compte des difficultés qu'éprouvent de telles personnes vis-à-vis une existence qui leur paraît nouvelle et effrayante.

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